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Corn Borer Loss 1955 Estimated at \$182 Million

Damage Heaviest in
Illinois, Indiana,
Minnesota and Iowa

— See Table on Page 8 —

WASHINGTON — More than 155 million bushels of corn grown for grain, worth more than \$182 million, were lost because of European corn borer damage in 1955, the U.S. Department of Agriculture has estimated.

This is approximately 5% of the total national crop, but is less than the estimated 7% loss in 1954, which amounted to almost 192 million bushels. The 1955 loss is the third highest of the past seven years.

Greatest losses occurred in Illinois, Iowa, Indiana and Minnesota, (Continued on page 8)

Smoke Oven Ammonium Sulfate Production Shows January Gain

WASHINGTON — Production of smoke oven ammonium sulfate during January totaled 167,103,521 lb., compared with 158,890,242 lb. in January, 1954, according to the Bureau of Mines, U.S. Department of the Interior. Exports in January were 157,581,817 lb. compared with 146,432,388 lb. in January a year earlier. Stocks on hand at the end of the month were 980,321 lb., a gain from 324,786 lb. on Jan. 31, 1955.

African Pyrethrum Group Announces It Will Build Plant

NEW YORK—African Pyrethrum Development, Inc., has announced plans for the erection of a new pyrethrum-extraction plant at Nakuru, Kenya, Africa. The facility will be the largest in the world, the announcement states. Manufacturers of equipment in both the U.S. and in European countries have been advised of the construction plans.

Capacity of the new plant will be from 2,500 to 3,000 tons of flowers annually, with plans including allowances for future expansion.

The extraction plant is being planned by the Pyrethrum Board of Kenya, an organization representing the pyrethrum growers. Its requirements were brought to America by Dr. John R. Furlong, the board's scientific advisor. Dr. Furlong also designed and built the board's laboratory, opened at Nakuru late in 1955—the first one exclusively for pyrethrum research.

The planned capacity of the plant, according to African Pyrethrum Development, Inc., is substantially the total amount of blossoms now shipped in bales to the United States for extraction here. The only other extraction plant now operating in Africa is one at Nairobi with a capacity of 2,000 tons a year. The pyrethrum extract can be flown, in case of need, to processors, whereas baled flowers must be sent by ship over the long route from Mombasa or Dar es Salaam, on the East Coast of Africa, to American ports, it is pointed out.

Kenya, together with the neighboring states of Tanganyika and (Continued on page 21)

Indecision on Farm Bill Affecting 1956 Fertilizer Tonnage

By JOHN CLIPPERLY
CropLife Washington Correspondent

WASHINGTON—The apparent filibuster of the high price support addicts in Congress has already had its effect on the farm community and the plant food industry. The uncertainty it has created within the farm commodity areas has delayed purchases of plant food materials, so that orders now piling in are taxing the industry to its limits.

As the Senate delayed its consideration of the farm bill through time-consuming speeches by high support advocates and debate on more than five score amendments offered from the Senate floor, farmers were unable to adapt their planting plans to the uncertainty the Senate debate created. This has had the effect of telescoping farm demand for plant

food materials into a much shorter period than normal.

But industry spokesmen here are not faint-hearted, and insist that the plant food industry will do as well this year as last in terms of plant food sales, despite the fact that tonnage may be reduced. Spokesmen for the trade were unable to answer some questions concerning the effect of farm legislation at this session, due to the great uncertainty over the topsy-turvy bill which the Senate approved and sent to the House for conference agreement.

As the Senate bill went to the conference, the House agriculture committee chairman continued the "filibuster-type" approach to the farm bill. He has called his committee into executive session for examination of the Senate bill and will summon Ezra Taft Benson, Secretary of Agriculture, to explain the bill to the committee on March 27—as if the House committee has not had full time to examine the Senate actions during the debate.

The Senate or congressional delay on the farm bill is seen as an effort to prevent the soil bank provisions from taking effect this year. USDA and trade officials are unable to come through with solid agreement on the soil bank operation due to the uncertainty over any final date on legislation approval by Congress and subsequent approval at the White House.

The only guide in this complexity is found in statements by influential Republican farm leaders in the Senate who declare that unless the conference committee can modify the bill in major respects, that the White House will hand down a resounding veto. That attitude is confirmed in press conference statements by the President himself who (Continued on page 20)

North American Deliveries of Potash Register 7% Increase During 1955

— See Charts on Page 21 —

Deliveries of Agricultural Potash Salts—1955

Point of delivery	In Tons of 2,000 lb. K ₂ O	Muriate, 60 & 50%	Manure salts	Sulphates	Total
Total U. S.	1,759,096.50	1,226.42	115,115.49	1,875,438.41	
(Imports)	(133,726.65)	(...)	(23,157.50)	(154,884.15)	
Canada	81,581.72			7,018.22	88,599.94
(Imports)	(139,503.84)			(11,724.10)	(41,227.94)
Cuba	7,924.44			2,761.81	10,686.25
Hawaii	15,700.83			2,458.50	18,159.33
Puerto Rico	10,949.07			2,023.83	12,972.90
(Imports)	(4,266.58)			(11,130.16)	(5,396.74)
Total institute territories	1,883,252.56	1,226.42	130,177.85	2,014,656.83	
Other exports	69,080.29			3,326.54	72,406.83
Total agricultural	1,952,332.85	1,226.42	133,504.39	2,087,063.66	
(Imports)	(177,497.07)			(26,011.76)	(203,508.83)

NOTE: Import figures given in parentheses are included in all totals.

District of Columbia, Illinois with over 192,000 tons K₂O was the leading state followed in order by Ohio, Indiana, Georgia, Florida and Virginia, each taking more than 100,000 tons K₂O during the year. Due to shipments across state lines, consumption does not necessarily correspond to deliveries within a state.

Agricultural potash accounted for

over 95% of deliveries. Muriate of potash continued to be the most popular material comprising nearly 94% of the total K₂O delivered for agricultural purposes, and sulphate of potash and sulphate of potash magnesia over 6%.

Deliveries for chemical purposes in 1955 were 170,427 tons of muriate of

(Continued on page 21)

Construction to Start Soon on Calspray Plant in France

RICHMOND, CAL.—Construction of Calspray's European Orthocide plant will soon begin in Southern France and is expected to be in production by October, 1956.

A sum of \$1,500,000 has been appropriated by Standard Oil Company of California for this project, which was first announced by Norbert B. Van Buren, president of California Spray-Chemical Co., Francaise and Calspray's manager of Eastern Hemisphere Operations, at the third International Orthocide Conference in Nice, France last November.

**Olin Mathieson
Sales, Earnings
Show Gain in 1955**

NEW YORK—Substantial increases in assets, net working capital, sales and earnings were reported March 20 by Olin Mathieson Chemical Corp. in its annual report released to stockholders.

Total assets at the end of 1955 rose to \$621,777,000 from \$497,050,000 in 1954, a rise of 25%. Net working capital, at the end of 1955, totaled \$193,632,000 compared to \$183,211,000 at the end of 1954.

John M. Olin, chairman, and Thomas S. Nicholas, president, in their message to stockholders, noted that net sales rose to a record high of \$560,480,000 in 1955 compared to \$502,478,000 in 1954, an 11.5% increase. Net profits in 1955 totaled \$44,558,000 compared to \$38,075,000 in 1954. Profits increased 17% and earned \$3.51 per share of common compared to \$3.11 in 1954 on a small-

er average number of shares outstanding in that year.

Sales of plant foods and insecticides increased during 1955 according to the report.

Total federal and foreign income taxes of the corporation amounted to \$37,882,000 in 1955, up from \$30,450,000 in 1954, an increase of 24%. The higher 1955 total reflects the larger volume of business done and the increase in taxable income. These taxes in 1955 amounted to \$3.05 per share of common stock, to \$1.52 per dollar of dividends paid and to \$964 for each employee of the corporation.

During 1955 four quarterly dividends of 50¢ per share were paid on the common stock bringing total common stock dividends for the year to \$2 per share. Due to the larger average number of shares outstanding in 1955 total dividends paid on the common stock increased to \$24,003,000 from \$19,593,000 in 1954.

Payment of dividends on the convertible preferred stock was made at the prescribed rate of \$4.25 per share annually, or \$1.0625 per share quarterly.

terly. Total dividends paid in 1955 on this stock amounted to \$948,000.

The gross value of the physical plant, property and equipment increased by \$113,474,000 bringing the total to \$479,160,000 at Dec. 31, 1955. Of this increase, \$84,447,000 reflected the purchase of timberlands and pulp and paper facilities. The remaining \$29,027,000 represented other capital additions approximately one-half of which represented construction of a new cellophane plant at Olin, Indiana.

The amount charged for depreciation of plants and equipment and for depletion of timber, salt and other natural resources totaled \$19,581,000 in 1955 compared with \$18,934,000 in 1954.

Arrangements also were made in 1955 for financing the construction of its new aluminum facilities. Funds for this project will be provided partly out of the corporation's own resources, which were by the sale of surplus timberlands in Arkansas, Texas and Louisiana. In addition, a commitment has been arranged for a long term loan of \$60 million.



Clyde C. Taylor

**Clyde C. Taylor Named
Assistant Manager of
Diamond Black Leaf Pla**

RICHMOND, VA. — Clyde Taylor of Mentor, Ohio, has been appointed assistant plant manager the Richmond, Va. plant of Diamond Black Leaf Co., manufacturer pest-control products, it was announced here by O. E. Clary, plant manager.

For the past two months, Taylor has been a staff assistant the company's national headquarters in Cleveland. From May, 1953 January, 1956, he was a draftsman the Central Engineering Department of Diamond Alkali Co. A World War II veteran, Mr. Taylor served in the U.S. Army.

**Pennsylvania House
Passes Fertilizer
Regulatory Act**

HARRISBURG, PA. — Pennsylvania's House of Representatives March 14 unanimously passed a bill which would require registration with the state of every grade and brand of commercial fertilizer and fertilizer material sold in state.

Backed by Gov. Leader's administration, the measure also calls for "control inspection fee" of five cents a ton. Proceeds would be used to defray the costs of inspection, sampling and analysis of all fertilizers.

The measure also would set up a licensing fee of \$15 a year for each brand and grade, with the funds be used for enforcement of the law. Liquid fertilizer and other similar new products would be covered by the bill.

Applications for state registration would have to carry a guaranteed analysis for each grade and brand. Distribution of misbranded products would be made unlawful and the state agriculture secretary would be empowered to cancel registrations, assess penalties against manufacturers if any product fell short of guaranteed analysis.

Every person distributing commercial fertilizer would have to file semi-annual statements showing how much he distributed by counties during the previous six months.

Violations would be punishable by a fine of \$50 to \$100 or up to 30 days in jail for first or second offense. Penalties for subsequent conviction would be a fine of \$500 to \$1,000 or up to one year in jail, or both.

PAUL R. McMILLER DIES

ST. PAUL — Paul R. McMiller, professor emeritus of soil at the University of Minnesota, died recently. He had been on the university teaching staff 44 years.

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FARM SERVICE TANKS					
500 Gal.	28" dia. x 196" O.A.L.	1,000 Gal.	41" dia. x 193" O.A.L.		
500 Gal.	46" dia. x 79" O.A.L.	1,000 Gal.	46" dia. x 145" O.A.L.		
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Sales and Earnings Of American Potash Reach Record Highs

LOS ANGELES—Sales and earnings of American Potash & Chemical Corp. in 1955 were the best attained to date, Peter Colefax, president, said in his annual report to shareholders, issued from company headquarters at Los Angeles.

Sales increased 17% and earnings 62% over 1954. The company also made substantial progress in its program to broaden its position in the chemical industry, Mr. Colefax said.

Net sales for the year ended Dec. 31, 1955, were \$27,731,612 compared to \$23,631,032 for the previous year.

Net income was \$4,060,192. After deducting preferred dividends, earnings on the 624,377 shares of Class A and Class B stocks outstanding at the year end were \$6.14 a share. In 1954 the company's net income was \$2,510,909, equivalent after preferred divi-

dends to \$4.38 per share on the 486,984 shares then outstanding.

Included in these sales and earnings figures are the results for November and December 1955 of the former Western Electrochemical Co., at Henderson, Nev., which was acquired in November and is now operated as American Potash & Chemical Corp. (Nevada).

Commenting on 1955 operations, Mr. Colefax stated that sales of boron products, soda ash, salt cake, lithium carbonate and potash all increased over 1954. Shipments of potash to Japan were made for the first time since 1939. Sales of the company's refrigerants and agricultural chemicals showed significant gains.

Net working capital of the company was \$11,828,917 at the end of the year, compared with \$5,390,652 a year earlier.

Mr. Colefax stated that the continued growth of the company requires an intensive research program, and to this end the research budget

was increased during 1955 to approximately 3.5% of sales and has been further expanded in 1956. Specific emphasis is being placed on boron and lithium chemicals. Construction of a \$200,000 addition to the company laboratory at Whittier, Calif., which will double the available working space, was begun last December.

NAMED TO STAFF

NEW HAVEN, CONN.—Appointment of Dr. Forest W. Stearns, on leave from Purdue University, to the Department of Forestry at The Connecticut Agricultural Experiment Station for five months has been announced by Dr. James G. Horsfall, director of the station. Henry W. Hicock, head of the Department of Forestry, says that Dr. Stearns will study the germination of hemlock seed from selected sources under controlled conditions of light and temperature, and investigate the effects of chemical treatments on germination of hemlock seed.

Rain, Cold Weather Do Little Damage To Mid-South Crops

MEMPHIS—Stopped by rains and cold weather for several weeks, South farmers last week had hoped they could resume spring plowing.

Surveys by the agricultural extension services in Arkansas, Mississippi and Tennessee showed that the cold weather of the last weeks had not materially damaged the crops.

Spring pastures were reported in good condition and coming of expected warm weather will bring further improvement. Some farmers are now to plant corn, but officials were optimistic over the possibility of getting much cotton planted during the month.

A study by Mississippi officials showed that boll weevils infestation will be heavier this year than last, but that more poison will be needed.

Mississippi fruit crop prospects apparently suffered little damage in frost and below freezing temperatures, the Mississippi Agricultural Extension Service reported.

A check with experiment station personnel at the Crystal Springs Branch Experiment Station and the State College station showed slight damage to peach and pecan trees.

Boll weevil survival is far above average this year based on a count of 266 samples, according to a report from Dr. Marvin Merkl of USDA at Booneville.

The statewide average survival is 33% of weevils that went into hibernation last fall. For the Delta survival rate is 1,355 weevils per acre and in the hill areas 1,065.

A. G. Bennett, extension entomologist, said this indicates strong possibility of heavy infestations again this year. Such survival calls for a stepped up early season control program.

Rains and wet land further held up land preparation for the planting of 1956 row crops.

"Possibilities for March planting of cotton are slight due to continuing rains," said T. M. Waller, extension cotton specialist.

Southeast Missouri farmers were advised to plant their bean crop either in latter April or May by extension officials.

"Farmers have found from experience that most early bean crops planted last year didn't fare as well as those planted later on," W. James, Pemiscot County agent, said.

Rainy weather last week again prevented planting of March crops and cut field work by farmers, Mr. James said.

Bureau to Move

SACRAMENTO—Equipment for the new Bureau of Chemistry laboratory in the California Department of Agriculture Building annex is being installed and the bureau, headed by Allen B. Lemmon, is expected to move about April 1. The Bureau of Chemistry has been located for many years in the basement of State Office Building No. 1 where the department formerly maintained headquarters.

LEAVE OF ABSENCE

ST. LOUIS—Richard N. Augustson, St. Louis, has been granted a leave of absence from Monsanto Chemical Co.'s Inorganic Chemical Division development department to undertake an assignment of about two years duration with Monsanto Chemicals Limited in England, it was announced by Joseph J. Burbage, division development director. Augustson will be primarily concerned with economic evaluation of new processes and progressing of projects in the development department of the English company.

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Market for Fungicides in Control of Plant Diseases Indicative of Great Future

The great revolution in agricultural chemicals is now 21 years old. The era of organic pesticides was launched in 1934 by Tisdale and Williams, with their announcement of a new class of fungicides — the alkyl dithiocarbamates. Organic fungicides, therefore, are now of age. It is well to review the station of this young man of chemistry in our society, examine his potentials for growth, study the traits of character he must develop, and review his opportunities to serve mankind.

This is a weighty assignment because the glittering successes of organic fungicides are counterbal-

anced by some conspicuous failures. The brilliant research achievements of the past two decades are littered with hundreds of broken dreams and hopes. A mass of new and useful knowledge has been accumulated but both the chemists and biologists are still working in the dark. Like most parents, we in research are somewhat baffled and confused by the mistakes of an adolescent but we are certain he is fundamentally sound and ready to grow into a productive maturity.

Like most infants, the organic fungicides were relatively slow to get started. Five years elapsed after the

discovery of the dithiocarbamates before commercial development began and then it was the quinone fungicides. By 1941, Spergon (chloranil) was making such inroads in the seed treatment market that the potential usefulness of the organics was clearly indicated and intensive research was initiated in several laboratories. Space does not permit a full review of their practical achievements or a discussion of all types of new fungicides now available, but a few examples will illustrate what they have meant to American farmers and the American people who profit so much from the most efficient agriculture in the world.

The shift from copper and mercury treatment of pea seed to chloranil and dichlorone has never been fully appraised. The mercury compounds were wonderful seed disinfectants but often failed to control soil inhabiting fungi that caused seed decay, particularly in periods of heavy rainfall. The copper oxides were excellent seed pro-

tectants but were mildly injurious to the more acid soils and to some varieties on any soil. Chloranil came to the scene in 1940 as the only universally reliable protectant that could be used on all pea seed irrespective of where it was to be sown.

Extensive data taken on the far upstate New York during 1946 showed that the benefits from the pea seed treatment averaged 47.750 lb. of shelled peas per acre, depending upon general weather conditions at planting time. This is a gain of 20 to 40%. If one accepts a yield increase of 25% as a fair general average, an increase of \$21.25 an acre in 1951 prices is realized. On the basis of 466,510 acres sown for fresh peas in the U.S. in 1951, the gross return would be \$9,913,000 per annum. A comparable gain on the acreage used for dry peas would double this figure. A gain of approximately 19 million dollars is being achieved in economy from an investment in labor and materials of \$772,457 (70¢/acre). Any Wall Street broker would love to have an equally promising investment opportunity!

These figures are based on a relatively minor crop. They could be expanded by including data on other seed treatments. For example, an investment of about 4¢ an acre in corn returns about 3 bu. per acre (\$5.04) in most areas of the U.S. An investment of 30¢ an acre in spinach seed treatment will yield \$50 an acre and data are available of \$300 per acre gain on very productive farms.

The really significant contribution from these seed treatments, however, has been much more than a few dollars per acre. They have made a revolution in agricultural practices. They are the means of sowing early so the farmer may select the most favorable season for producing his crops. Twenty years ago the farmers of Iowa seeded their corn about May 15-20. Today they dare to treat seed by April 20 to May 10 without fear of stand failure and with confidence that the crop will be well established and setting ears by the time the late summer drouth usually appears.

The major use of fungicides is in spray applications rather than as seed treatments. By virtue of the new organic sprays, farmers are controlling diseases today that were considered uncontrollable two decades ago. Among these are cedar-apple rust, powdery mildew and anthracnose of tomato and other crops. Many other diseases are being controlled better with less injury to the crop. By use of Nabam, Zineb, and Mancozeb on potatoes, the late blight disease has been brought under control with a startling improvement in yields.

The situation on potatoes is so interesting it is well to examine it closely as a pattern of what can be done in areas where we had been reasonably complacent with the treatments in use before 1940. The following data from the Statistical Abstract of the U.S. show what has happened to potato culture since the turn of the century.

Period	Average Harvested	Yield per Acre (lb.)
1901-1905	3,115,000	91.2
1911-1915	3,473,000	100.4
1921-1925	3,359,000	106.2
1931-1935	3,510,000	107.7
1941-1945	2,818,000	140.3
1945	2,700,000	155.0
1946	2,598,000	186.0
1947	2,101,000	185.0
1948	2,109,000	215.0
1950	1,690,000	253.0

These data show a steady program in improving yields during the first 40 years of this century. Very modest improvements were achieved in World War I, but in World War II the agricultural scientists had a storehouse of information to put to work. Checks on full production were

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Editor's Note

This paper, titled "The Future of Fungicides in Agriculture," was prepared by Dr. George L. McNew, managing director of Boyce Thompson Institute for Plant Research, Yonkers, New York, for presentation before the spring meeting of the National Agricultural Chemicals Assn. The meeting was held at Hollywood, Fla., March 14-16.

So the new varieties, the fertilizers and mechanical handling could put to work in all-out production. The master achievement of a 31% increase in yield per acre during this 5-year period resulted. This was nothing as compared to what followed the war in the next 5 years. Yields increased by an average of 100 bushels per acre so production is currently about 70% higher than it was during the war years.

Thus, in 1950 the American farmer was supplying the consumers 100% more potatoes than at the turn of the century even though he had released over 40% of his potato acreage for other crops. A greater record of achievement has never been written in man's struggle against starvation and control over the forces of adversity that plague him.

Why did this great increase occur 1946-1950 after we had done everything possible during the war years? This is primarily due to the fortuitous invention of two new organic pesticides that worked hand-in-glove to give a better crop. This fact stands out even after due credit is given to wider acceptance of fertilizer, irrigation, and new varieties. It is a pest-control phenomenon that surprised even the entomologists and plant pathologists by its magnitude.

The introduction of DDT to control potato insects provided positive kill of leafhoppers for the first time in history and made it possible to forego the use of repellent copper sprays which had been harmful in many areas — possibly more harmful than had been realized while leafhoppers had run rampant. The introduction of Sabam and Zineb controlled foliage diseases effectively without retarding plant growth. In many trials the yield advantage over established spray materials ran from 40 to 80 bu. per acre. Thus, by tailoring organic molecules to fit the needs of the crop as well as the needs of pest control, the pathways were opened for potatoes to take full use of the fine cultural conditions established during the war years. It is little wonder that potato growers use a major share of the 22 million pounds of alkylene bisdithiobarbamates being used currently.

Should anyone question the contributions of the organic pesticides to the greater productivity of potatoes, they can examine the statistics on any one of several crops where plant disease control measures have been less revolutionary. The yield of sweet potatoes increased from 93.5 bu. an acre in 1901-1905 to 96.3 bu. in 1945 and to 102 bu. by 1950. Corn (maize) increased from 26.6 bu. to 32.8 bu. by 1945 and only to 37.4 bu. by 1950 in spite of spray operations introduced to control the borer during the latter period. The wheat crop averaged 14.4 bu./acre in 1901-1905, 17.5 bu. in 1941-45, and dropped back to 16.5 bu. by 1950. The statistics hidden under a multitude of causes all point to the fact that the great change in potatoes must be ascribed to changes in pest control practices since other crops showed no comparable acceleration of yield at this time. Such data as illustrated here serve to show that the organic fungicides

need no apology. They have made their full contribution to human welfare in the past two decades. The question remains as to whether we have achieved everything necessary and can be satisfied. The answer is no. The surface of our needs for better fungicides has scarcely been scratched.

It is physically impossible to determine exactly how much damage plant diseases are doing in spite of an expenditure of about 125 million dollars a year in their control. The best estimate for the decade 1942-1951 was a loss of 2.8 billion dollars on the farm, or 7% of all crop and forest productivity. When the losses in transit and storage are added to this figure, the loss in the United States may be conservatively placed at about \$24.20 per person each year or approximately \$85 per household.

The losses from microbiological deterioration of material such as structural timber, buildings, fabric, plastics, leather, etc. are no less impressive. The hidden losses from fungus

attack on wood products alone amount to 300 million dollars annually. The problems of material deterioration were brought sharply into focus when American troops were placed on the islands of the South Pacific during World War II. Shoes disintegrated in a matter of weeks and clothing after a few days' exposure to the warm moist conditions.

Something analogous is happening on a less intensive scale every day in this country wherever fibers, plastics, leather, paints, wallpaper, etc. are exposed to moist atmosphere. This deterioration has been estimated at 12 billion dollars annually. Losses from oxidation are very high but most organic materials lose strength or disintegrate because of enzymatic hydrolysis directly traceable to microorganisms.

It would be foolish to claim that all these losses on the farm, forest, and home in everyday use of organic materials could be eliminated. However,

CROPLIFE, March 26, 1956—7

there is every reason to believe that 50% of the damage can, and will, be eliminated within the next two or three decades. Since better data are available on plant diseases than other forms of microbiological deterioration let us examine what this would mean.

If half the losses of food and fiber on farm and in storage were eliminated the public would receive benefit of about 1.7 billion dollars. Upon the assumption that a farmer will pay only about one dollar for each ten dollars of potential benefit because of the production hazards involved in farming, this provides a chemical market of approximately 175 million dollars at the consumer level. The primary producer can look forward to a sales volume of about 85 million dollars to satisfy the potential needs of our agricultural economy for fungicidal chemicals. Such a market justifies an annual expenditure of about 3 million dollars for research on agricultural fungicides. In what markets should this investment be placed? In

(Continued on page 18)



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Micro-Cel*, a new line of synthetic calcium silicates, has extremely high absorptive properties. It is this remarkable capacity for absorption that makes it possible to prepare wettable powders with higher concentrations of dry, viscous or liquid poisons. Micro-Cel's absorption also means that more lower cost diluents can be used. Thus high strength formulation costs are now cut to a new low.

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**Virginia Pasture Tour
Scheduled for April 11-12**

BLACKSBURG, VA.—A regional pasture tour of Eastern Virginia will be held April 11-12, according to J. F. Shoulders, associate extension agronomist, Virginia Polytechnic Institute. The tour will visit livestock and dairy farms in six counties as well as the Eastern Virginia Research Station.

MORE HYBRID CORN

CLEMSON, S.C.—South Carolina farmers will plant more hybrid corn in 1956 than ever before. Approximately 60% of the state's corn acreage was planted with hybrid varieties in 1955, and in 1956 the acreage in hybrid corn is expected to reach 70 to 75% of the total corn acreage, according to H. A. Woodle, leader, Clemson agronomy extension work.

Estimates of Damage by the European Corn Borer to Corn Grown for Grain in the U.S. in 1955

State—	Counties			Estimated data			
	Known infested	Included in estimate	Total state production	Value per bu. Dollars	Value of production, 1,000 dol.	—Loss of crop— 1,000 bu. 1,000 dol.	
Connecticut	8	8	160	1.50	240	Trace	1
Delaware	3	3	4,920	1.19	5,855	395	470
Illinois	102	102	507,752	1.14	578,837	64,168	73,151
Indiana	92	92	270,760	1.08	292,421	9,540	10,303
Iowa	99	99	476,468	1.22	581,291	47,787	58,300
Kansas	88	26	22,858	1.28	29,258	129	166
Maryland	23	23	16,224	1.23	19,955	664	817
Michigan	51	18	75,624	1.09	82,430	840	915
Minnesota	87	63	252,950	1.13	285,833	8,702	9,833
Missouri	112	76	153,621	1.14	175,128	4,846	5,524
Nebraska	84	83	96,000	1.62	155,520	5,280	78,551
New Hampshire	9	8	94	1.50	141	Trace	1
New Jersey	21	12	3,864	1.40	5,410	181	253
New York	60	14	9,890	1.26	12,461	11	13
North Dakota	44	19	13,005	1.04	13,525	193	200
Ohio	88	88	234,360	1.03	241,391	5,812	76,015
Pennsylvania	67	67	47,608	1.31	62,366	1,103	1,444
Rhode Island	5	5	43	1.50	64	Trace	1
South Dakota	63	42	69,115	1.17	80,865	3,152	3,687
Vermont	14	14	88	1.50	132	Trace	1
Virginia	99	21	28,272	1.25	35,340	415	519
West Virginia	51	5	6,435	1.38	8,880	5	6
Wisconsin	71	71	86,684	1.13	97,953	2,133	2,410
Total	1,341	959	2,376,795	...	2,765,296	155,356	182,581

*Does not include 295 counties in 14 other states not listed above.

†Estimates prepared by state.

CORN BORER

(Continued from page 1)

estimates showed. Illinois lost more than 64 million bushels of her 1955 crop, Iowa almost 48 million bushels, Indiana about 9½ million bushels and Minnesota almost nine million bushels.

Estimates were compiled from 23 counties in 23 states responsible for 83% of the nation's grain corn production. The counties represent 5% of those known to be infested by corn borer.

Actual surveys of borer populations were made in 700 of the counties in fall, and losses were computed for additional 259 infested but unsurveyed counties in these states. The estimates are included in the "operative Economic Insect Report" issued by USDA's Agricultural Research Service.

Special
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In 1917 state fairs were awarding prizes for outstanding farm products just as they are today. Then as now, growers depended on Trona® MURIATE OF POTASH for high quality crops. For it was in 1917 that Trona, first to produce domestic Potash when World War I pinched-off foreign sources, shipped the first trainload to the east coast. For the next twenty years Trona was the only domestic source of Potash and today, in spite of AMERICAN POTASH AND CHEMICAL CORPORATION'S broad diversification program, is still one of the primary basic suppliers of high grade Muriate and Sulphate of Potash for Agriculture.

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These experiments are part of the program started last year in a series of demonstration plots throughout the entire cotton area of the U.S., Cyanamid reports. These demonstrations have since been extended to cotton growing areas in many parts of the world.

Cyanamid has been conducting experiments and demonstrations with the U.S. Department of Agriculture, state agricultural experimental stations, and county agricultural agents. Future demonstrations with the insecticide are to be announced throughout the cotton area of southern U.S. through the offices of local county agents.

Tests with Thimet in both soil treatment and direct sprays were promising results on corn, peas, beans, lettuce, beets, peanuts, potatoes, tree fruits, and tobacco seedlings, are also being continued company says.

Three seed treaters have been named by Cyanamid to handle Thimet during the 1956 season. They are Rogers Deltint Cotton Seed Co., Waco, Texas; Southwest Sprayer Chemical Co., Waco, Texas, and Landale Seed & Deltint Co., Landale, Miss.

Better Selling

Richer
Fields for
Dealers

A SPECIAL CROPLIFE DEPARTMENT TO HELP RETAILERS IMPROVE MERCHANDISING KNOW-HOW

SHOP TALK

OVER THE COUNTER

FOR THE DEALER

By EMMET J. HOFFMAN
CropLife Merchandising Editor

The farmer—as the potential fertilizer customer—is the final judge of the worth of fertilizer. Dealers, therefore, are interested in having farmers get the information about fertilizers and their use which will cause them to buy or—if already customers—to increase their purchases.

Experience has shown that meetings with farmers and dealer meetings at which the use of fertilizers is discussed are effective activities for improved fertilization practices among farmers. Such activities as field trips, demonstration plots and helping farmers obtain

soil tests also rank high in importance in promoting farmer-adoption of improved fertilization practices. Not to be overlooked by dealers are such activities as motion pictures showing fertilizer use, exhibits about fertilizer use, fertilizer schools, newspaper ads, posters, handbills, bulletins, pamphlets, radio and direct mail.

Farmers who participate in fertilizer demonstrations, it has been shown, are usually among the first to try out new ideas and practices. By accumulating more experience, these demonstration farmers serve as an example to neighboring farmers. They usually are leaders in their community. Once accustomed to using fertilizer these farmers no longer think about whether or not to use it but consider how much to use, what kind and when to apply it.

All of this indicates that demonstration farmers play responsible roles in introducing and proving the value of fertilizers to other farmers. Dealers can help their own business by encouraging and helping farmers set up demonstration plots. Successful fertilizer demonstrations offer visual proof of fertilizer utility.

Bankers

Take Lead

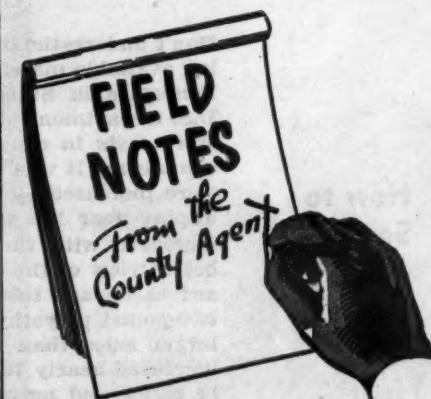
The Minnesota Bankers Assn. has initiated a statewide program of soil testing, an action which deserves the commendation of the fertilizer industry.

More than 6,000 soil analysis kits have been shipped out to Minnesota banks for use in their trade territories.

County agents and the soil testing laboratory of the University of Minnesota will play vital parts in the program also. Tests will be made at the university laboratory in St. Paul and results forwarded to county agents who will notify the farmers.

Minnesota bankers have apparently become aware of the fact that soil fertility is closely linked to the prosperity of the state's economic structure. Also, dealers are apt to find their local banker more aware of the soundness of fertilizer loans as a result of this new program.

Minnesota fertilizer dealers have an opportunity of further enhancing their place in the business community by visiting their local banker at the first opportunity and dropping a word of thanks for the forward looking and progressive program adopted by the Minnesota Bankers Assn.



By RAYMOND ROSSON
County Agent, Washington County, Tenn.

How good are your three acres? To maintain a standard of living, such as is ours, the average American, including all ages and groups, has but three acres of crop land from which to obtain his food and clothing.

Just suppose all the people in our cities and towns had to produce their needs, and could plant, cultivate and harvest these needs from the three acres. Just how would we grow our cereals, vegetables, fruits, berries, tobacco and cotton?

How would we raise our dairy cattle, beef cattle, sheep, hogs and poultry on our allotted three acres. And of course the cows would have to be milked, the chicks brooded, the hens fed and eggs gathered, the pigs farrowed and fattened and the beef fattened.

Then too, how would we maintain the productivity? We would need to lime, apply nitrogen, phosphorus and potash, to say nothing about fighting insects and diseases.

A three acre farm, with milk cows, beef cattle, hogs and poultry, along with the corn, small grain, alfalfa, pasture, cotton, tobacco, vegetables, fruit and berries, truly would be a sight.

Of course we couldn't do it . . . we have to leave all this to our farmers, and they do it by specializing, just as we manufacture, sell and serve in one way or another.

Industry and labor, professional people, as well as farmers have a big stake in all these acres. They are all rightly concerned about our productive soil and water resources. They realize as never before that these resources are linked directly to the future prosperity of our nation.

Why Farmers Do or Don't Accept Recommended Practices

EDITOR'S NOTE: Those concerned with selling to the farmer—whether it is a commodity or an idea—are constantly faced with the question: "How am I going to convince the farmer that my product or idea is sound?" In the following article, I. A. Spaulding, a rural sociologist associated with the University of Rhode Island, describes a case study made of two farm operators. In the study it was determined that there is a relationship between the farmer's character and his acceptance of recommended farming practices.

▼ ▼

The way a farmer's ideas, feelings, and behavior are related to each other has a bearing on what he does about recommendations to improve his farm and farm operation. The acceptance or rejection of an improved farm practice may often depend on how well it fits into this character structure, or personality.

Some idea of how this works has come from a research project at the station. A case study was made of two farm operators and from this was determined the relationship between character structure and the acceptance of recommended farming practices.

In the character structure of Case A, there are two components which conflict with each other and can be seen in his pattern of behavior. One of these is aggression against people; the other is dependence upon people. Their interference with each other tends to produce feelings of anxiety, or fear. Much of what "A" does is performed in a manner which avoids getting these two conflicting components working strongly at the same time and thus producing strong anxiety. Consciously or unconsciously, "A" tries to keep himself in situations where one or the other will be the predominant aspect of his relationship to people. This, however, is not always possible. Neither is it possible for him to avoid anxiety, however slight, even in situations which seem to be undisturbing when he first enters them.

Even though this conflict exists in his character structure, his aggression and dependence are not complete opposites. Integration, which bridges part of the gap between them, is found in his great degree of self-centeredness. This self-centeredness, essentially a high estimation of himself, shows up as related to both his aggression and dependence. As an integrating component of his character structure, self-centeredness helps to keep down his fears—or, at least, to minimize his conscious recognition of them.

Contributing, also, to keeping his anxiety quieted and to expressing his aggression and dependence are his use of money and his feeling that the boundary and field system of his farm ought not to be changed. These two aspects of his make-up are seen most readily in the way his acceptance or rejection of recommended practices is related to them and to his expression of conflict between aggression and dependence as it appears in his occupational activity.

Although "A" is primarily a cash-

crop farmer, his aggression is expressed in dairy farming activity and he defines himself as being a dairy farmer. His dependence is expressed in the activity of custom farming. Each of these activities involves the use of money which contributes to the maintenance of his level of living and "position" in society. Likewise, each can be carried on without disturbing the boundary and current field system of his farm; changing either the boundary or the field system would make it necessary for him to alter his occupational routines.

Under these circumstances, "A" established recommended practices which fitted a pattern of aggression in the role of dairy farmer, making money, and maintaining the boundary and field system of his farm. When the use of this pattern of behavior lost its effectiveness in allaying the anxiety in his character structure, "A" ceased to accept recommended practices and began highly active behavior as a custom farmer. In this role he was afforded stability by relating himself dependently to people, by the money he received for his work, and by avoiding the possibility of making some changes in the boundary and field system of his farm.

In the character structure reported as Case B, there are six components which are related to each other and to his acceptance or rejection of recommended practices. These are his pride (self-centeredness), aggression, dependence upon people, a tendency to place emphasis on knowledge and understanding (intellectualization), concern about money, and concern about the boundary and field system of his farm. As they are expressed in his activity as a farmer and as a store employee, these components are fairly well integrated and function to keep his underlying anxiety quieted—or consciously unrecognized—yet, they interfere with each other enough so they are the source of some anxiety. By intellectualizing, "B" handles the conflict with a system of "putting first things first" ("The family comes first and then the farm").

Under these circumstances, "B" established recommended practices which fitted into a pattern of the above six components of his character structure. There were adequate integration and stability to give a basis for expecting that "B" would continue establishing recommended practices as long as his system of integration was not altered.

Information of this sort, which casts some light on the question of why farm operators do or don't make use of means available to them for improving their farms, has practical significance for those engaged in educational work with farm people. We are often inclined to expect people to act on the basis of some sort of "rational motivation" or to make an "objective choice." The data from this study suggest strongly that the emotional, "irrational" characteristics of a person—some of which may be unconscious for him—are involved in what appears to be "rational motivation" or "objective choice." So-called "rational" behavior may, in fact, be but a well integrated expression of unconscious feeling.

Better Selling

Richer Sales Fields for Dealers

CROPLIFE, March 26, 1956

CROPLIFE, M

Louisiana Aerial Applicators to Meet

BATON ROUGE—Recent developments in the application of insecticides to crops by airplane will be the subject of a conference for pilots to be held at Louisiana State University, March 30.

About 45 licensed pilots operated in the state in 1955. Insecticides were applied by plane to about three fourths of the state's 670,000 acres of cotton and substantial acreages of other crops were treated.

Out-of-state speakers at the conference will include George A. Roth of the Texas A and M College Aircraft Research Center and E. C. Boudreux of the Food and Drug Administration, New Orleans office.

Mr. Roth will discuss aviation equipment and its most efficient use

in application of insecticides. Mr. Boudreux will discuss provisions of the Miller Bill, insecticide residues on crops and hazards in the use of insecticides. Other topics at the conference will include identification of insects that commonly are controlled by airplane applications of insecticide, the proper flagging of fields for efficient airplane application and regulations concerning insecticide applications and the work of the pilots.

RESEARCH GROUP FORMED

AMES, IOWA — The Iowa Crops and Soils Research Assn. has been formed here to buy a farm for study and demonstration of crops and soils. The group will work in cooperation with the Iowa State College Agricultural Experiment Station.



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"Horse & Lion" Calcium Nitrate: 15½% pure nitrogen, combined with about 20% available lime. Granulated.

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"Horse & Lion" Urea 44": 44% pure nitrogen. Coated pellets for dry use.

"Horse & Lion" Urea 46": 46% pure nitrogen. Pellets without coating for liquid application or dry use where fast dissolving desired.



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RINGING THE cash register

Merchandising Hints for The Retailer

Sales Room Necessary

For some reason or other there is a reluctance by some farm supply retailers to provide an adequate sales room. Some retailers' headquarters consist of little more than a warehouse and it is impossible to tell where the sales room ends and the storage area begins. Often the sales room is entirely too small. One well known merchandising authority states that a 30 by 30-ft. sales room is a must. Let the farmer see, feel and smell every product you have for sale by displaying them in the sales room in a convenient manner. The dealer can usually get plenty of ideas from other stores, trade publications or from other merchants on setting up an adequate sales room.

How to Sell More

Don't underestimate the value of related selling and making available merchandise in various sizes where possible. Pennsylvania State University, in cooperation with the U.S. Department of Agriculture, recently made some food store tests in consumer response to differences in merchandising. It was found that average sales of mushrooms were increased by one fourth by the use of a suggested display near the steaks in the meat case. Tomato sales increased with the use of a plastic tube which gave a better view of the tomatoes as compared with the standard cardboard tube. A combination display of one- and two-pound polyethylene bags of carrots resulted in 37% larger sales than sales of pound bunches. Potato sales increased nearly 70% when washed potatoes were offered in paper and polyethylene sacks as compared with unwashed potatoes in paper sacks.

Incentive Plan

Melvin Hatch, owner of the Hatch Feed & Seed Store, Hendersonville, N.C., credits his fine group of capable key employees with a large degree of the success and growth of his business. The turnover among key employees is very low and Mr. Hatch gives this as the reason: "All of the key employees are on an incentive plan or bonus arrangement." Mr. Hatch has six full time employees and sales per man average about \$4,000 per month according to a recent issue of the Checkergraph, Ralston Purina Co. publication. Four regular outside routes are operated in the Hendersonville area and they bring in about half of the firm's business.

Today's Special

An outside stand, 3 ft. by 3 ft. in size has been constructed on one side of the Service Feed, Seed & Hardware Store in Beaumont, Texas. A different item is placed on the stand once each week. Directly over the stand, mounted on a large iron pole, is a sign reading "Today's Special." It calls attention to passers-by on the busy highway in front of the store. A large back has been constructed behind the stand and goes up to a height of more than 7 ft. The store makes its own price sign, using brown wrapping paper and red paint. The price sign is placed over the item being displayed and customers can tell at a glance the bargain being advertised. If a particular item doesn't sell well after being on display for two days, it is removed and another item is placed on display. The store is well satisfied with the results of "Today's Special" and several new customers are attracted each week.

Slogan On Roof

The Randolph (N.Y.) Feed & Supply Co., owned and operated by Michael and Lee Gates, had so much response to a "Let's Get Acquainted" promotion by local merchants that it had a 40-ft. sign, "Let's Get Acquainted," painted on the roof of its mill.

Handling Complaints

One retailer states he has developed a technique for answering a customer complaint which works to his complete satisfaction. When faced with a complaint he listens carefully and waits until the customer is through. Then he re-words the complaint in his own words to make sure he understands the customer's view. During the time he is re-stating the complaint he is preparing the answer in his mind. This method avoids the possibility of saying the wrong thing before proper thought can be applied to the answer. Invariably, this technique clears up the atmosphere considerably, the retailer states.



FARM SERVICE DATA

Extension Station Reports

E. M. Trew, Texas A&M extension economist, says that pastures need fertilizing because they remove plant material as fast as any other crop. One ton of grass hay contains about 30 lb. of nitrogen, 10 lb. of phosphoric acid and 30 lb. of potassium.

In some areas, pasture forage is naturally deficient in phosphoric acid and lime or both. When stock are grazing on an area deficient in one or more of these, they can not make proper gains and often have trouble growing and breeding.

In a grass-legume mixture, legumes tend to disappear if minerals such as phosphate, lime or potash are deficient. Grass in a grass-legume mixture can be stimulated by nitrogen application.

For those permanent pastures the fertilizer should be applied in the fall or winter or in the early spring before the summer plants begin growth.

The additional nitrogen in the spring and summer will stimulate growth and increase protein in the plants, Mr. Trew says.

Cotton farmers can reduce the amount of hoe labor in the production of their crop through use of chemical herbicides, the Louisiana State University Agricultural Experiment Station says in a new publication now being distributed throughout the state.

Entitled "Chemical Weed Control for Cotton," the publication presents the station's recommendations based on several years of experiments in a new method of weed control. It was written by Dr. W. K. Porter and H. Thomas of the Main Station, F. Curtis of the Northeast Louisiana Experiment Station, and D. R. Lovell of the Red River Valley Experiment Station.

★

The Louisiana State University Agricultural Extension Service is encouraging the cooperation of dealers, organization spokesmen and

in a drive to increase corn yields per acre in Louisiana in 1956.

G. Killgore, associate agronomist in the extension service, says that although the state averaged only 30 bu. to the acre in 1955, most of the farmers who used hybrid seed plus other methods of fertilization, cultivation and insect control made more than 50 bu. to the acre.

When best methods are used yields

more than 100 bushels to the acre,

more than three times the state

average for 1955 and five times the

average for 1949 through 1953 are not uncommon, Mr. Killgore adds.

The purpose of the yield increase

campaign is to encourage more

farmers to use hybrid seed, closer

planting of plants in the row, heavy

fertilization, shallow cultivation

and other better corn production

methods recommended by the

Louisiana State University Agricultural Experiment Station.

The extension agronomist points out that corn is now Louisiana's most important crop in acreage, although it is used as a feed crop and little is sold.

During the 1949-53 period, Louisiana

had 700,000 acres of corn a year.

Now the state had 615,000 acres of

corn, 526,000 acres of rice and 253,000 acres of sugarcane.

tural Research Service and southern state experiment stations.

Sericea, an important perennial lespedeza widely grown throughout the South for pasture and hay, has proved especially valuable for soil-building and erosion control. In the past year, growers produced about 11 million pounds of sericea seed.

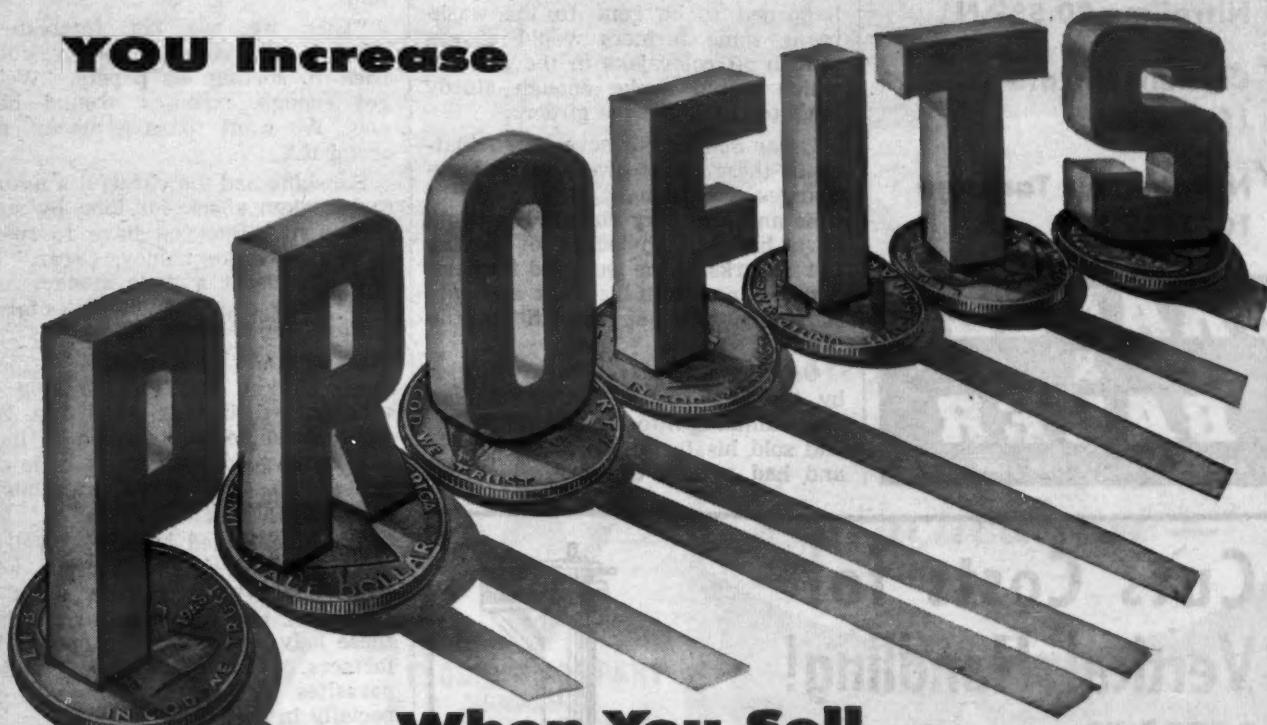
The value of drill seeding—as compared with broadcast seeding—is firmly established. In field tests at Beltsville, Md., during the past three years, USDA scientists found that drill-seeded sericea consistently made better stands, averaging 130% more plants, than when broadcast seeded. However, a comparison of broadcast and band fertilization (fertilizer placed about an inch below the seed)

made in these same tests indicated a need for further studies to determine the best way to fertilize sericea.

During the exceptionally dry years of 1953 and 1954, drilled sericea seed produced about three times as many plants when broadcast fertilized as when band fertilized. However, when the scientists checked second-year growth in the test fields, they found that the surviving plants from the band fertilization trials had made enough extra growth to produce as much dry matter as the greater number of surviving broadcast-fertilized plants.

In 1955, a year of normal moisture, initial emergence of plants was uniform under both fertilization methods, but band-fertilized plants grew more vigorously—an important factor in stand establishment.

YOU Increase



**When You Sell
Lion Nitrogen Fertilizers**

Because The LION Brand Is Pre-Sold

HERE'S THE LION LINE-UP OF QUALITY NITROGEN FERTILIZER MATERIALS

Lion Anhydrous Ammonia—62.2% nitrogen. Quality guaranteed.

Lion Aqua Ammonia—Ammonia content about 30%—other grades to suit your requirements.

Lion Ammonium Nitrate Fertilizer—Improved spherical pellets. Guaranteed 33.5% nitrogen.

Lion Nitrogen Fertilizer Solutions—Various types to suit your particular manufacturing needs.

Lion Sulphate of Ammonia—White, uniform, free flowing crystals. Guaranteed 21% nitrogen.

Retailers who market Lion nitrogen fertilizers are enjoying sales increases and expanding profits, because the Lion brand is being continuously *pre-sold* to farmers—and retailers reap the benefits.

Throughout the year, Lion advertising appears in leading state farm publications, and in Farm & Ranch-Southern Agriculturist, Prairie Farmer, Progressive Farmer, and Wallaces' Farmer & Iowa Homestead. These advertisements tell farmers—again and again—the facts about plant foods: that the farmer who uses the proper kinds and amounts of commercial fertilizers will increase his yields and his profits. This advertising sells fertilizers, for Lion and for you!

Lion's two giant chemical plants have the capacity to assure you a steady supply of the most popular and economical types of nitrogen fertilizers. In fact, Lion is the world's largest manufacturer of prilled ammonium nitrate, and one of the industry's leaders in producing other nitrogen fertilizer materials.

It's easy to sell nitrogen fertilizers with the Lion emblem on the bag, or Lion's anhydrous ammonia. And easier selling adds up to more profits for you.

DISTRICT SALES OFFICES: LION OIL BUILDING, El Dorado, Ark. • INSURANCE EXCHANGE BUILDING, Des Moines, Ia.
NATIONAL BANK OF COMMERCE BUILDING, New Orleans, La. • 1401 BUILDING, Atlanta, Ga.

LION OIL
A DIVISION OF MONSANTO
CHEMICAL COMPANY



COMPANY
EL DORADO, ARKANSAS



FERTILIZERS



✓ Anhydrous Ammonia

✓ Nitrogen Solutions

✓ Ammonium Nitrate
33.5% N

✓ Triple Superphosphate
46% A.P.A.

✓ Muriate of Potash
60% K₂O

✓ Nitrolime 20.5% N

✓ Calcium Nitrate
15.5% N

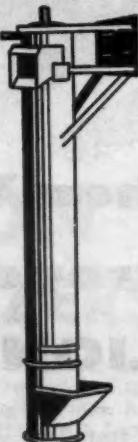
✓ Nitrogenous Tankage
10/11% NH₃

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**Cuts Costs for
Vertical Handling!**
BURROWS
THORO-SPEED
VERTICAL
SCREW
CONVEYOR

- Only One Moving Part
- Easy Clean-Out
- Meets Your Requirements



The fastest vertical conveying possible is obtained when you use the THORO-SPEED. Handle fertilizers, chemicals, minerals, grain, feed, etc. Available 6-9-12 inch diameter, with loading hoppers at floor level or above floor . . . built to the length you need. Comes ready to install with motor mount, can be put in quickly. All models have a clean-out at the bottom for quick and easy cleaning.



Auger Elevator

For loading out or filling big bins. 25-30-35-40-50 ft. sizes.



Apex Bagging Scale
Eliminates bag weight complaints. Extremely accurate and easy to operate.



Eze Move Scale
Bulk scale, self-discharging - brake equipped - easy rolling - rugged and durable.

ALL YOUR NEEDS—ALL THE TIME
WRITE FOR COMPLETE INFORMATION

BURROWS
EQUIPMENT COMPANY

1316-V Sherman Ave.

Evanston, Ill.



It is doubtful whether in the long history of America that more diverse topics have ever been discussed in spots other than farm supply stores. And the establishment of Schoenfeld and McGillicuddy was no exception. To this store came farmers from near and far to tell their troubles and recite their joys.

And here, too, came farmers to make snide remarks about what a hard time farmers have making a living and how easy fertilizer dealers earn their money. And, if Tillie Mason happened to be gone to the washroom, some farmers would always tell an off color joke in the interim, which would evoke enough sturdy laughter to shake the girders.

Oscar Schoenfeld never participated in these social give and take exchanges. He thought it a waste of time and also very vulgar. He would sit at his desk, obviously not hearing the remarks of the gathered farmers, and continue with his work and only snort mentally at the things the farmers said.

One morning, a tall lanky farmer by the name of Sunshine Peterson came ambling into the salesroom. He had sold his farm two years before, and had retired to town. He often

came in to chat if anyone would listen to him. He was often lonesome as retired farmers frequently are.

"Hello, Oscar," Sunshine greeted. "I got a dandy idea for you today. Got so excited about it I could hardly sleep all night."

Oscar looked up coldly from his desk, his bald head very official looking. "Does it cost anything?" he asked sharply.

"Well, not very much," the farmer said.

"Then we are not interested," Oscar said quickly and finally, going back to sorting his papers. "We've got enough expenses around here now. We want to save money, not spend it."

Sunshine had too cheerful a nature to be taken aback for long by such treatment. "But you have to spend money to make money, Oscar," he said. "At least a little money. And I've got an idea that will make farmers love you."

Oscar didn't care whether farmers loved him or not, just so long as they paid their bills when due, but what Sunshine said seemed to indicate more good business at little expense. So, he asked cautiously, "What's this big idea?"

Sunshine smiled broadly. "Well, I got a nephew out in Colorado who has found a way to gather a lot of lady bugs, Oscar, and he writes that these lady bugs are being bought by farmers out there to eat soft bodied parasites and injurious insects, especially in orchards."

Oscar frowned. "What has that got to do with us here?"

Sunshine chuckled. "It's got plenty to do, Oscar. My nephew's got the idea of shipping these lady bugs out here, and havin' me sell them on a little commission basis for him. I thought you fellers could sell lady bugs by the quart here in the store. Then I'll make a commission and you fellows will make a profit, too."

"We should sell ladybugs?" Oscar intoned unbelievingly.

"Sure, why not, if you make money at it?" Sunshine said. "Farmers want to get rid of insects, don't they? And ladybugs sure eat a lot of insects. We can sell them cheap and farmers will buy."

Oscar looked around at the shelves of the store loaded with packages of insecticides and other supplies, bought by an enthusiastic Pat McGillicuddy in anticipation of a banner year. "Look at those sagging shelves," he told Sunshine Peterson. "If we sell ladybugs to farmers, what are we going to do with all that stuff? Ach, we will make money on one and lose on the other."

Sunshine Peterson looked worried, as he rubbed his bristling chin. "Gosh, I never thought of that, Oscar," he said dejectedly. "Darn it, something like this always happens to me. I get all steamed up about an idea I think is gonna make me some extra change and then somebody shows me where I'm wrong. I guess I had better do what my old lady says: keep my mouth shut."

At this moment, Pat McGillicuddy entered. He greeted Oscar and Sun-

shine Peterson, then said, "Sunshine, you look like you've lost a long-time friend. What's wrong?"

So Sunshine told him the story about the ladybug idea and how Oscar had shown up its flaws from a merchandising angle. "If you sell ladybugs, you won't be able to sell so much insecticide, Pat," Sunshine said discouragedly. "I shouldn't have come here with the idea in the first place."

Pat looked very thoughtful. Suddenly his blue eyes lighted. "Yes, you did right to come here, Sunshine. I'm very sure we can use your idea. In fact, it may prove to be a lulu."

Sunshine's brown eyes popped wide open. "Yeah? How?"

Oscar's lips narrowed to a thin line as he saw Pat rub his hands and talk to Sunshine.

"Farmers around here will be greatly interested in what lady bugs can do with the insect problem. This newspaper man will snap up a story on it. And when those canned lady bugs get here and we display them, many farmers will come and take a look and the publisher will show some pictures. That'll be good advertising."

"But how about our stock on the shelves!" Oscar almost sneered. "You sell ladybugs, you won't sell much of that!" He looked very satisfied.

"Sure we will," Pat said. "We may sell more. The interest in ladybugs will focus more interest on insect control. We couldn't get enough lady bugs shipped in here to supply the demand, so farmers would have to buy insecticides from us. In fact they might become so much aware of the insect problem through this ladybug publicity that they'll use more insecticide and so we'll profit."

As Pat talked, Sunshine Peterson straightened his lean frame. Now he looked very confident. "Well, maybe I ain't so dumb as I thought I was. Wait until I tell the old lady. This time, she's the one who will have to keep her mouth shut, not me!"

"Sunshine," said Pat enthusiastically, "when can we get the first shipment of ladybugs from Colorado?"

The tall, retired farmer paled, then his hands shook. "You—you mean I'm in business?" he asked.

"Sure thing," Pat encouraged. "We want to get the publicity started on ladybugs. It's something new in the way of advertising."

Sunshine's lips moved nervously. "Whoopie!" he yelled. "I'll go right home and write my nephew and ask him how much per bushel. Then you can tell me how many bushels you want shipped. They come in cartons, I understand."

All this time, Oscar sat at his desk chewing his lips as he looked at the papers. Now, as Pat came back to his desk Oscar said nothing.

But he did raise his hand to his nose and held it tight for a few seconds. That gesture told Pat clearer than words, just what Oscar thought of the whole idea of ladybugs in a fertilizer and farm chemicals store.



WINNER—Mrs. Hempton Pugh portable TV set when her name was drawn in the J. B. Beaird Co.'s "acquainted contest" held at the Ammonia Institute convention in Kansas City, Mo. Wife of Mr. Pugh, general manager of Pugh Gin and Fertilizer Co., Tillman, Okla., Mrs. Pugh is shown receiving the set from Ty Adams, Beaird and NH, Systems representative of Arkansas and Northern Mississ-

Fertilizer Returns at Best Stocks, Economist Says

MEMPHIS—The potential return of a farmer's fertilizer dollar exceeds that on some "blue chip" stocks, reports Gordon B. Nance, University of Missouri agricultural economist, in the current issue of Agricultural Ammonia News.

Nance said fertilizer pays dividends at a rate that is almost comparable to investors in general or in stocks.

Let us consider the rate of return on some of the more popular investments," Mr. Nance wrote. "General Motors pays less than 5%, Standard Oil of New Jersey and U.S. Steel 4%, and DuPont 2 1/2%. People bid up the prices of these stocks to where returns are this low."

Compare this to the returns received from fertilizer. The data in form that suited me best were on below-average corn belt land planted to corn which was priced at \$1.50/bu. The first \$6 worth of fertilizer per acre returned 201%, the next \$6 worth 227%, and so on, until they had to use \$40 worth per acre before the return from the last application declined to 5%.

The marvel of the ages is that everyone knows this, practically no one acts on it—and I mean practically no one. I don't know 'ary one who does. How many of you own farms and supposedly know fertilizer will do—use fertilizer to the extent that the last increment is only the current interest. It would only embarrass you. If and when I go to farming own—not in partnership—I'm to apply fertilizer until the last dollar barely returns that dollar, not that I will want to swap, but that I want to make sure getting the maximum profit on the amounts, and I will count what's left after the first year pay-

ing interest on the last dollar's worth."

Mr. Nance debunked arguments advanced in an effort to explain why farmers might fear taking such a "risk."

"Then fertilizer use will be perhaps six to 10 times the piddling little 30 to 40 lb. now used on the average acre of cropland and pasture in the U.S. and the 50 to 60 lb. used in Missouri," he continued.

"Now don't ask me when we will use six to 10 times as much fertilizer as we do now," Mr. Nance concluded. "It is likely to be several years, but I'm certain that the increase in the use of fertilizer in the next decade will be two or three times as rapid as in the last 10 years."

Arkansas Melon Farmers Look Toward Big Year

LAKE CITY, ARK.—Watermelon growers in the St. Francis River Delta of Northeast Arkansas are optimistically looking forward to planting a heavy acreage this spring.

Officials of the Lake City Watermelon Growers' Assn. said members will plant three new varieties this year.

They are Congo, Charleston Gray and "Yellow Belly" melons. These will be in addition to the Black Diamond and Black Lee. The new types are being introduced because buyers seemed to show a preference for these new varieties.

Melons will be planted during the

first week of April in order to have them ready for marketing in July and early August.

Heavy production of melons is expected in the area of Lake City, Monette, Caraway, Black Oak, Leachville, Bowman, Lunsford Bay and nearby districts, all in the St. Francis River Delta here.

SALES TOTAL 41,629 TONS

CLEMSON, S.C.—Fertilizer sales in South Carolina during January totaled 41,629 tons, according to the state Department of Fertilizer Inspection and Analysis. Sales for the seven month period of July-January totaled 161,576 tons, a decrease of 14.8% from 189,733 tons during a corresponding period a year earlier.

As an adsorbent carrier...



approved by both
laboratory tests
and
practical use—

DILUEX

ASSURES BETTER

Pesticide Formulations

As a carrier and diluent for insecticides, fungicides, sprays and dusts, Diluex and Diluex A exceed the most exacting qualifications of the agricultural chemical industry.

Diluex and Diluex A are basically an aluminum magnesium silicate mineral, having an amphibole-like structure possessing a large adsorption capacity for liquid impregnation procedures used in processing the newer complex organic insecticides. Both products are widely accepted as superior grinding or milling aids for technical grade toxicants such as DDT and BHC and will discharge readily from commercial dust applicators giving uniform coverage and minimum fractionation of toxicant and carrier in the swath.

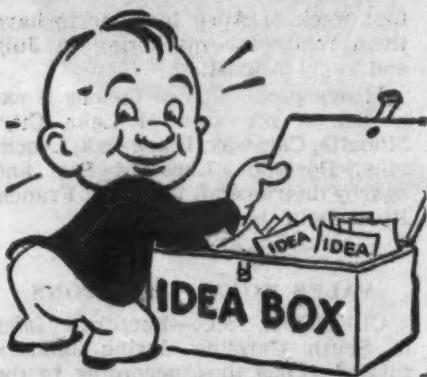
Write for complete specifications and samples; our technicians are available to help with your processing operations.

For soil pesticide formulations, try adsorptive granular Florex.

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Better Selling

Richer Sales Fields for Dealers



What's New...

In Products, Services, Literature

You will find it simple to obtain additional information about the new products, new services and new literature described in this department. Here's all you have to do: (1) Clip out the entire coupon and return address card in the lower outside corner of this page. (2) Circle the number of the item on which you desire more information. Fill in your name, your company's name and your address. (3) Fold the clip-out over double, with the return address portion on the outside. (4) Fasten the two edges together with a staple, cellophane tape or glue, whichever is handiest. (5) Drop in any mail box. That's all you do. We'll pay the postage. You can, of course, use your own envelope or paste the coupon on the back of a government postcard if you prefer.

No. 6389—2,4-D Folder

The Stauffer Chemical Co. has prepared a folder on the use of its 2,4-D products for weed control in crops. Listed are control recommendations for weeds in corn, sorghum, wheat, oats, barley, lawns, turf, pasture and flax. The table provided in the folder is based on the latest information available for the north central states area, the company states. Listed also are annual and perennial weeds that need one treatment and those that usually require more than one treatment. Dosages required are included. The folder may be secured without charge by checking No. 6389 on the coupon and dropping it in the mail.

No. 6388—Grassland Film

The story of grassland farming for dairy and beef farmers is told in a new full-color, sound-slide film released by General Chemical Division, Allied Chemical & Dye Corp. The company states that "the 45-minute film gives the latest authoritative information on profitable practices in

modern pasture management. Particular emphasis is placed on the new methods of fertilizing, insect and weed control, harvesting, and silage preservation that are contributing to the boom in grassland farming." Entitled "Green Pastures," the film was produced as an educational service by General Chemical and is available for showings to farm audiences by persons or groups active in agricultural education work. Check No. 6388 on the coupon and mail it for information about securing the film.

No. 6391—Weed Control Guide

The 1956 edition of the GLF Chemical Weed Control Guide has been released by the GLF Soil Building Service, division of the Cooperative GLF Exchange, Inc. The 62-page guide contains a list of "watch" words of weed control, and weed control recommendations for the dairyman, vegetable grower, lawn caretaker, fruit grower and diversified farming operators. Chemicals recommended to the control job are listed. A copy of the guide is available without charge by checking No. 6391 on the coupon and mailing it to Croplife.

Send me information on the items marked:

- No. 6379—Booklet
- No. 6380—Fertilizer
- No. 6381—Belt Conveyor
- No. 6382—Spreaders
- No. 6383—Fertilizer Packer
- No. 6384—Booklet
- No. 6385—Anhydrous Folder
- No. 6386—Antidotes Folder
- No. 6387—Booklet on Grasses
- No. 6388—Grassland Film
- No. 6389—2,4-D Folder
- No. 6391—Weed Control Guide
- No. 6392—Soil Moisture Meter

NAME

COMPANY

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PERMIT No. 2
(Sec. 34.9,
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MINNEAPOLIS,
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BUSINESS REPLY ENVELOPE

No postage stamp necessary if mailed in the United States

POSTAGE WILL BE PAID BY—

Croplife

P. O. Box 67,

Reader Service Dept.

Minneapolis 1, Minn.

CROPLIFE, March 26, 1956—1

CROPLIFE,

of pasture and range plants. The remaining sections of the series, to be published within the next 18 months will deal with other native grasses, legumes and forbs; undesirable grasses and weeds; weeds and poisonous plants; and introduced grasses and legumes. Each plant discussed in "Native Grasses—Legumes and Forbs," is illustrated by vivid, true-to-life water-color reproductions, printed in four colors. The grasses are described in detail; their uses and value as livestock forage are discussed; and the sections of the country where they usually are found or may be grown are given. Secure the booklet by checking No. 6387 on the coupon and mailing it to this newspaper.

No. 6384—Products, Process Booklet

A 36-page booklet entitled, "Products and Processes" has been prepared by the Union Carbide & Carbon Corp. Described in the booklet are varied lines of products and processes in which the company and its principal divisions are engaged. Among the lines are agricultural chemicals which appear under the brand name of "Crag." To secure the booklet check No. 6384 on the coupon and mail it to Croplife.

No. 6383—Fertilizer Packer

Features of a new fertilizer packer developed by Packaging Service, Bemis Bro. Bag Co., have been announced. The packer is claimed to hold consistently to weight tolerances of 4 oz. plus or minus on 50- to 100-lb. units. According to the announcement, the equipment "forms a complete packaging unit from product weighing through bag closing with a production rate of 16 to 18 eighty-pound bags per minute. It will handle all types of sewn open-mouth paper bags and textile bags, in size ranges of 50-, 80- and 100-lb. for paper and 100- and 200-lb. for textiles. Scales are available for fertilizers having either free-flowing or sluggish characteristics. The bag clos-



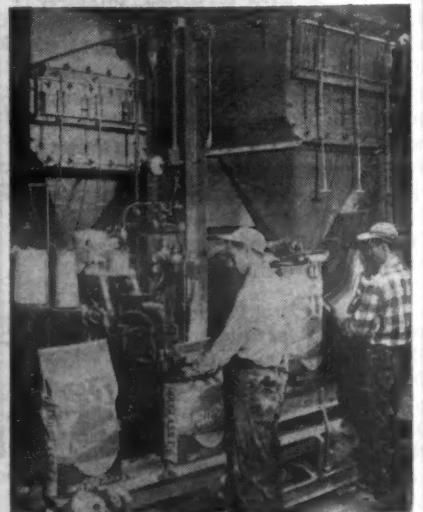
outlet. The unit is designed for use with either of the company's two-foot tapered "Gage-Stake" or individual "Gage-Plugs." By "plugging-in" the portable meter to stakes or plugs buried in the root zone, the grower determines the soil moisture content to the best irrigation procedure. Check No. 6392 on the coupon and mail it to Croplife to secure more complete details.

Also Available

The following items have appeared in the What's New section of recent issues of Croplife. They are reprinted to help keep retail dealers on the regional circulation plan informed of new industry products, literature and services.

No. 6387—Booklet on Grasses

Phillips Petroleum Co. has issued the first of a series of booklets on pasture and range plants. The booklet, "Native Grasses—Legumes and Forbs," is a guide to the uses and favorable locations for native grasses as livestock forage, strikingly illustrated by water-color reproductions. The series is being issued as a service related to the company's agricultural demonstration project, located on the K. S. Adams Ranch four miles north of Foraker, Osage County, Okla., where projects involving range management, fertilizer and other agricultural petrochemicals are under study. The booklet is available free to teachers and other persons interested in agriculture, as a teaching and training guide for a better understanding



ing equipment is said to be close to being fully automatic. As optional equipment, the company offers a newly-developed injector for insecticide treatment at the time of packing. Several installations of the new packer have been in commercial operation for a number of months. Secure more complete information by checking No. 6383 on the coupon and dropping it in the mail to Croplife.

No. 6380—Fertilizer

"Shur-Green" is the trade name of a new concentrated liquid fertilizer for lawn and garden use, manufactured by Continental Fertilizer Co. It will be available to most areas in the Midwest this spring, according to company officials. The new prod-

short chain
Two speeds are
drive choice
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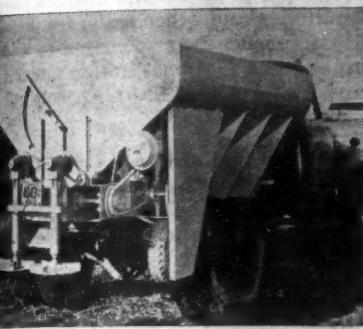
No. 6378—Fertilizer

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turnkey job
engineering, co

It comes in a concentrated liquid form which is applied as the turf or soil is watered. The garden hose is attached to an attachment called a "ero-gun" at the top of a quart container, and as the water sprays through the dispenser, the liquid fertilizer and water is automatically mixed. An average lawn can be fertilized in this manner in approximately 15 minutes, it is claimed. Secure more complete details by checking No. 6380 on the coupon and mailing it to Croplife.

No. 6382—Lime, Fertilizer Spreaders

A new line of lime and fertilizer spreaders, identified as the K-5 series, has been introduced by the Baughman Manufacturing Co. A choice of three types of conveyors and three types of drives is offered. Among the conveyors are the drag chain, chain belt and belt types. One drive choice is a power takeoff driven distributor and conveyor and drives direct to a 44-to-1 sealed gear case and by



short chain to the distributor case. Two speeds are available. The second choice has a power take-off driven distributor and a ground-driven conveyor. This is said to be ideal for automatic transmissions. The third choice has a hydraulic motor which drives the distributor (powered by hydraulic pump on power take-off). Other new body features have also been incorporated, the company states. Secure more complete details by checking No. 6382 on the coupon and mailing it to Croplife.

No. 6381—Belt Conveyor

Sectional belt conveyors in standardized, pre-engineered units with capacities ranging up to 1,500 tons per hour are described in a new Link-Belt Co. book No. 2579. The new conveyors called by the trade name, Pre-Belt, incorporate standard Link-Belt components, including the new series 10 idlers, packaged with sectional cross frames and structural steel supporting bents. They are built in 18, 24, 30, and 36-in. belt widths, with 24 and 42-in. deep trusses. Drives range up to 40 H.P. More information is contained in the illustrated 8-page book No. 2579. For a copy, check No. 6381 on the coupon and drop it in the mail.

No. 6379—Liquid Fertilizer Booklet

Available to readers is a new booklet, "Neutral Liquid Fertilizer," a publication prepared by Fabricated Metals, Inc. The booklet states that the company can provide "package plants engineered for almost automatic operation at various desired capacities." The company offers two plans: The do-it-yourself package which consists of the essential plant elements upon which there are patents pending. The converter or cooling reactor assembly, transfer equipment, necessary valves and fittings are shipped direct to the site. The monkey job provides all design, engineering, construction and installation for the manufacture of both aqua

and neutral mixes. Information about costs, manufacturing margins, technical details, advantages and leasing details are included in the booklet. Check No. 6379 on the coupon and mail it to secure the booklet without charge.

No. 6385—Anhydrous Ammonia Folder

A folder entitled, "Higher Yields—Greater Profits With Anhydrous Ammonia" has been prepared by Standard Oil of Indiana and is available for distribution without charge. Sections of the folder are devoted to: Anhydrous ammonia—what it is, how it's made, how it's applied, how it's fixed in the soil, when to apply it and how much to apply. One chart shows the approximate crop increase

per acre, under average farm conditions, with the addition of 10 lb. of fertilizer nitrogen. Another chart shows how profits increase as yield per acre of corn is increased by the use of fertilizer. The folder is produced in several colors and one corn picture in color shows the effects of the lack of major nutrients in the soil. Secure the folder by checking No. 6385 on the coupon and mailing it to Croplife.

No. 6386—Antidotes Folder

A folder on antidotes for various agricultural chemicals taken accidentally has been prepared by United Chemical Co., division of United-Heckathorn. The folder is prepared so that it can be made into wallet

size. One side of it is devoted to a list of "approved safety equipment," their manufacturers and distributors for products such as dusts and mists. The folder is available without charge. Check No. 6386 on the coupon, clip and mail it to Croplife and the folder will be sent to you.

TO BUILD NEW PLANT

BATON ROUGE, LA.—W. R. Grace & Co. has begun construction on its multimillion dollar polyethylene plant north of Baton Rouge, adjacent to the proposed barge canal. Taking part in the recent groundbreaking ceremony were Gov. Robert F. Kennon and Senator Russell B. Long of Louisiana, and T. T. Miller, president of the Polymer Chemicals Div. of Grace.

Customers

CAN See QUALITY in Fertilizer

If It Contains

SMIROW

TANNAZINE

PLAINLY VISIBLE in any good fertilizer mixture are the dark organic particles of SMIROW...a sales feature easy to point out, and a satisfying mark of quality to farmers.

100% natural organic, 90% water insoluble, 90% available.

Let us figure the cost of SMIROW delivered to your plant.

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A DIVISION OF SMITH-DOUGLASS CO., INCORPORATED
NORFOLK, VIRGINIA - GRANITE CITY, ILLINOIS

Good Dairy Pasture Program Pays, East Texas Test Shows

COLLEGE STATION, TEXAS—Unimproved pastures in East Texas furnished an average of only 50 days of grazing per acre, while 170 days of grazing per acre were provided by four "highest-yielding" permanent pastures in a study of pasture improvement practices conducted on 36 dairy farms.

The practices used by dairymen with the four highest-yielding pastures included:

1. Lime (about 1,600 lb. per acre) was applied to an average of 25 acres per farm. Most of it was spread during 1951.

2. The entire acreage was fertilized annually with an application averaging about 30 lb. of nitrogen, 33 lb. of phosphoric acid and 15 lb. of potash per acre. These nutrients were supplied by complete fertilizers, ammonium nitrate, superphosphate and mixtures containing superphosphate and potash.

3. An average of 8 acres per farm was manured each year.

4. A legume (crimson clover, white clover or vetch) was seeded on the entire pasture sometime during the 4-year period.

5. On the average, oats and vetch were seeded on 30% of the permanent pasture, mostly when a good Bermuda sod was not present.

6. The entire acreage was mowed once a year. Very little acreage was mowed more than once.

The total cost for pasture improvement averaged \$63.24 per acre, or \$15.81 per acre annually. This included the costs of labor, power and other items.

In 1954, these pastures furnished a total of 6,970 days of grazing per farm, or 170 days of grazing per acre. This is more than three times the grazing obtained from unimproved pastures in the area. On this basis, the cost for the increased grazing resulting from the improvement practices followed, averaged 13¢ a day per cow grazed.

Twenty five of the cooperating dairymen used somewhat similar improvement practices, and their methods are considered representative of the pasture-improvement work done on most dairy farms in the area.

An average of 62 acres per farm, mostly upland, was included in this improvement program. No clearing was required. The practices used were:

1. Approximately two thirds of the acreage was fertilized each year. Most farmers used a complete fertilizer, some with and some without additional nitrogen and superphosphate. In a few instances, ammonium nitrate was used with 0-14-7 or a similar mixture. The most common practice was to apply fertilizer at a rate of about 12-24-12 per acre on 40 acres of the pasture each year. Lime was spread on an average of 13 acres per farm.

2. Not all farmers used manure on pastures but for the group as a whole, 8 acres were manured annually.

3. Legumes, including crimson, white and hop clover, Kobe lespedeza and vetch, were seeded over most of the pastures.

4. Oats or rye and vetch were seeded on about a third of the pasture each year. Such plantings usually were made where a good Bermuda sod was not present.

5. The entire pasture was mowed once each year.

The annual cost of improving these pastures averaged \$8.44 per acre. During 1954, an average of 7,190 days of grazing was obtained per farm, 106

days of grazing per acre. This is 56 days more grazing than was obtained from unimproved pastures in the area. The cost of the increased grazing through pasture improvement was 15¢ a day per cow grazed.

A third group of farmers used less intense methods in an effort to get better pastures. The following practices were used on an average of 62 acres per farm:

1. Each year about a fourth of the acreage was fertilized. These farmers did not use nitrogen fertilizer. Their main dependence was on 0-14-7. The average fertilizer application was at a rate of 0-38-19 per acre on an average of 15 acres each year. Only two farmers used manure on pastureland, and none reported the use of lime.

2. Over a 3-year period, legumes were seeded on about a third of the acreage.

3. There was practically no seeding of oats or other winter grazing crops in connection with permanent pastures.

4. The entire acreage was mowed once each year, and it was necessary to mow about a third of the acreage a second time to control weeds.

The total expense for pasture improvement averaged \$4.09 per acre annually on these farms. This was approximately half the expenditure on most of the farms studied.

Permanent pastures on these seven farms furnished 70 cow days of grazing per acre, or only 20 days per acre more than was furnished by unimproved pastures. The cost per cow per day for the extra grazing was 21¢.

On the basis of results obtained, farmers with "highest-yielding" improved pastures obtained 770 days of additional grazing for \$100 invested in pasture improvement. "Intermediate" and "lowest-yielding" improved pastures averaged 660 and 495 days of additional grazing, respectively for each \$100 spent for improvement.

This experiment was conducted cooperatively by the Department of Agricultural Economics and Sociology, Texas Agricultural Experiment Station, and the Production Economics Research Branch, U.S. Department of Agriculture.

Fit Crops to Soils, Agronomist Tells Farmers

MEMPHIS—The secret of obtaining maximum crop yields was disclosed to Shelby County, Tennessee farmers recently by one of the nation's top agronomists.

"Fit your crops to your soils," advised Dr. Webster Pendergrass, soils and crop specialist for the Tennessee Agricultural Extension Service, in a talk before members of the Shelby County Soil Erosion Control Assn.

"Only when a farmer recognizes the close relationship between crop and soil and works in harmony with it is he able to attain maximum production," Dr. Pendergrass declared.

Fitting crops to soils, or soils to crops, he explained, involves the use of fertilization, liming, terracing, drainage and irrigation in proper proportion. All soils on a farm should be classified and only the crop best suited for it should be planted on a field, the agronomist said.

"The economic status of agriculture," Dr. Pendergrass said, "will improve as farmers recognize the direct relationship of soils to crops and crops to soils and apply their knowledge to their farming operations."

James P. Chase, association president, presided.

What's Been Happening?

This column, a review of news reported in Croplife in recent weeks, is designed to keep retail dealers on the regional circulation plan up to date on industry happenings.

Speakers at the annual spring meeting of the National Agricultural Chemicals Assn. at Hollywood, Fla. covered merchandising, public relations, creation of new markets and an industry-wide "read the label" campaign. The meeting was held March 14-16.

Petroleum Chemicals, Inc., jointly owned by Continental Oil Co. and Cities Service Oil Co., announced plans to build a \$12.5 million nitrogen plant at Lake Charles, La. It will produce 100,000 tons of ammonia annually.

Delay in bringing into effect the provisions of the "Soil Bank" was feared to mean it will not be effective in time for use during the 1956 season. Filibustering by legislators favoring high price supports was reported to be hampering the passing of the bill.

Stauffer Chemical Co. and West End Chemical Co. announced a proposed merger of the two firms, in San Francisco . . . Robert U. Haslanger was elected vice president of Escambia Bay Chemical Corp. . . . The California Fertilizer Assn. announced that its annual convention would be held Nov. 11-13 at the Hotel Del Coronado, Coronado, Cal.

The Western Cotton Production Conference held March 6-7 at Fresno, Cal. attracted some 700 persons. Prominent on the program were papers discussing control of pink bollworm, thrips, nematodes and other pests; fertilization, seed treatment and weed control. The conference was sponsored by the Southwest Five-State Cotton Growers Assn. and the National Cotton Council of America in cooperation with industry and Federal and State agricultural agencies.

Negotiations for the formation of a new fertilizer company in Mississippi were reported in Croplife, March 12. Mississippi Chemical Co., Yazoo City, Miss., said that the new plant would be located at Pascagoula, Miss. Its capacity would be 150,000 tons a year and the cost \$6 million.

A survey conducted by Croplife indicated good reaction to the introduction of application machinery that would allow farmers to apply insecticides at the same time as fertilizer was put on, without the necessity of premixing the two materials. Machines were reported to be on the market by E. S. Gandrud Co., Owatonna, Minn., and John Deere Mfg. Co., Moline, Ill.

A concession in the original request made by railroads for a 7% hike in freight rates was granted the fertilizer industry by the Interstate Commerce Commission. The increase will be 6% rather than 7% on most commodities, with ceilings on the amount of extra cost per ton on some items.

J. C. Gaines, Texas A&M College, was named chairman of the Southwestern Branch, Entomological Society of America, at the group's annual meeting at Ft. Worth, Texas, Feb. 20-21. Dr. Gaines succeeds D. C. Earley, Los Fresnos, Texas.

Greater areas of infestation have been marked up for the gypsy moth which has increased its area of activity by 8,750,000 acres in the past two years, the U.S. Department of Agriculture reported. The pest was first known in the U.S. in 1869, but has spread widely since that time.

Acreage allotments for peanuts were expanded for the 1956 season, the USDA announced. The increase was for 40,342 acres in Alabama, Florida, Georgia, New Mexico, North Carolina, South Carolina, Tennessee and Virginia.

That a tougher selling job lies ahead for custom applicators was emphasized at the Ohio-Indiana agricultural aviation conference at Columbus, Feb. 22-24. "Farmers will pull the purse strings tighter in 1956," one speaker said. "They will use ground equipment on hand. The plane applicator will have to show greater benefits if he takes in more cash this year."

Production of superphosphate in 1955 totaled 2,310,306 short tons, a gain of 3% over the 1954 output of 2,237,900 short tons, according to the U.S. Department of Commerce. Escambia Bay Chemical Corp. dedicated its new \$25 million nitrogen plant near Pensacola, Fla.

Nitrogen Division, Allied Chemical & Dye Corp., announced that it will install at its Hopewell, Va., plant facilities for production of solid ammonium nitrate. The firm also plans to place into operation at its Omaha plant new facilities for production of additional nitrogen fertilizer solutions. . . . National Farmers Union will erect a multi-million dollar fertilizer plant in Arkansas.

Current capacity for production of anhydrous ammonia was estimated at 4,072,000 tons NH₃ by the U.S. Department of Commerce. The department also said that more than 450 million pounds of toxic materials (not including formulations) were produced in 1955 . . . Swift & Co. announced that it would construct a new plant food factory in Pompano Beach, Fla.

The importance of good management in glassland farming was stressed at the annual meeting of the Association of Southern Agricultural Workers.

Chipman Chemical Co. announced plans to build a 2,4-D plant in Portland, Ore. . . . Fertilizer dealers at Wisconsin Farm and Home Week were told that today's high production costs make it necessary for farmers to get every crop acre to produce to the limit of its capacity.

Stauffer Chemical Co. and Wilson & Geo. Meyer & Co. signed a long-term exclusive sales agreement whereby the Meyer firm will broaden its distribution in the West and Midwest to handle the increased production of new pelletized agricultural phosphates made by Stauffer.

Dr. Malcolm McVickar, for many years associated with the National Fertilizer Assn. and later with the National Plant Food Institute, was appointed chief agronomist for the California Spray-Chemical Corp. The appointment was to become effective April 1, 1956.

FUNGICIDES

(Continued from page 7)

other words, where is the major need for research?

Four of the several outstanding markets that should be developed are: Soil fungicides and nematocides to control root rots, wilts, and seed decays; Bactericidal chemicals to control leaf blights, stem cankers, and wilts; Rust and powdery mildew eradicants that can be used at low dosages per acre by aerial application; Systemic protectants that can be used to eliminate established infections of wilts, cankers, and foliage where parasites are inaccessible to surface deposits.

The root rots are the most under-evaluated problem facing the American farmer today. There is a great complex of soil fungi, bacteria and nematodes that cause root rots, wilts, black shank, stem canker, root galls and a host of other diseases that are essentially uncontrolled. It is impossible to estimate their damage so plant pathologists pass them over lightly. However, losses throughout the United States from these types of pest must average 5% of our corn, cotton, pea, bean, tobacco, tomato, wheat, sugar cane, watermelon, strawberry, and many other crops. Once control measures are developed, it would not be surprising to find this estimate to be only half or a third of the true figure.

Peas, for example, are subject to five fungus root pathogens and as soon as they become established in a soil, yields drop to 50% or less and pea culture must be abandoned. No one knows better than the processing company how many hundred thousands of dollars are spent each year in long hauls of the crops to the viner stations as production is pushed farther and farther away from the fertile areas surrounding the plant area.

Many people boast of the great uniformity and productivity of the Midwest's hybrid corn. It is a great achievement but it also is uniformly susceptible to *Pythium* and *Fusarium* in the soils so we hear more and more complaints about "drouth" injury. Probably half of the "drouth" injury

in the more favorable corn-growing areas is a manifestation of root rot. When Guatemalan corn collections were tested in the Midwest during 1947, many of them were found resistant to root rot. They thrived and continued green while prize domestic hybrids had their leaves fire and wither in the blazing heat of late summer after a wet spring.

Crops on tremendous areas of the South suffer chronically from southern blight, numerous nematodes and bacterial diseases. The losses from these pests on cotton and tobacco have been a millstone around the farmer's neck. If the soil becomes too moist the plant rots off; if it becomes too dry the roots cannot supply enough water to prevent heat damage. Only lately have scientists begun to pay proper attention to the nematodes.

There is great need for a soil infesting chemical. The nematodes, fungi and bacteria are all grouped together in this discussion, even though they are obviously different in nature, because they are inseparable in many disease complexes and often respond similarly to fungicide-nematocides. There are millions of acres that ought to be treated regularly. The market will stand a price of \$35 per acre repeated every third year but not a price of \$200 or \$300 except on high cost crops.

The area to be treated probably aggregates 9 million acres for corn (10%), 5.5 million acres for cotton (25%), 2 million acres for wheat (3%), 800 thousand acres for tobacco (50%), 270 thousand acres for peas (30%), 220 thousand acres for beans (10%), and 70 thousand acres for tomatoes (10%). The percentage of the crop area that would respond to a readily available chemical is problematical but these estimates would not seem unrealistic in light of the wide prevalence of the diseases.

The bacterial diseases are nowhere near so numerous or widely disseminated as the fungi, but about 20 of the 170 species are intensely destruc-

tive wherever they occur. The difficulty of controlling them with conventional chemicals such as fungicides has discouraged research. The antibiotics manufacturers have shown that the diseases need not be left to run wild any longer. Unfortunately, the cost of such chemicals is a serious handicap to widespread use of the method. There is no reason why organics cannot be synthesized to do the job equally well.

Fireblight of pears that drove pear culture from the East, across the Midwest and to the Far West where it has been fighting a losing battle will be controlled by Agrimycin or other antibiotics. The tremendous losses on midwestern apples also can be eliminated. The price of saving a productive orchard 15 to 50 years of age can be high. Time alone will tell whether bean culture, particularly the bean seed industry, can be restored to the East from whence it was driven by the two bacterial blights about 25 years ago.

Other markets are the bacterial canker and wilt of tomato, the speck disease of pepper and tomato, the bacterial wilt of cucurbits and potatoes, the black arm disease of cotton, wildfire of tobacco, bacterial shot hole of peaches and other stone fruits, and an assortment of stem cankers. A good economical spray material and disinfectant would be welcomed throughout many of the areas where these crops are grown.

The cereal rusts are a classical example of a disease controlled by use of resistant varieties. It has been a difficult problem because the multitudinous races become adapted to resistant varieties. Unfortunately, the rust can breed a new race in two weeks while the plant breeder requires about 10 years to breed a new variety of wheat or corn and get it established. Because use of a resistant variety is an economical form of control, few people have considered the use of chemicals against rust. This complacency, however, is on its way out and many people are reconsidering their position.

The case for use of chemicals in rust control is very good today. Treatments may be applied expeditiously and economically from the air so the mechanical problem is no longer so forbidding. Highly effective new organics can be used. The fear rests with many thoughtful people that the time will come when a new race of rust will appear that has no known genetic counterpart for resistance in the host. One such minor race of black stem rust of wheat reputedly exists in South America today. If such a race ever becomes established in the wheat belt, every bit of knowledge on chemical control will be needed.

Finally, farmers can no longer endure severe losses for three, four, or more years while the breeders are hybridizing, backcrossing, field testing and multiplying the seed stocks of a new variety. Let us look at the situation in Durum wheat today. Race 15B of black stem rust appeared five years ago in the Midwest. It became more prevalent during 1950-1953. By 1954 it was causing losses of 25% in some states, and farms in many areas had crops so poor that they were not worth harvesting.

If we can ignore for a moment the impact on the individual farmer, we can examine what this means to the average American. The New York Times for March 19, 1954 summarized it very nicely by pointing out that farmers were planning to plant only 1,112,000 acres as compared to the 1,658,000 of the preceding year and 2,103,000 two years previously in spite of the fact that the government had removed all controls on Durum wheat acreage. The article continues as follows:

"The growers are tiring of their losing battle with black stem rust. . . . A normal yield of Durum formerly was about 35,000,000 bushels.

In 1952 production dropped to about 22,000,000 bushels and in 1953 to 14,000,000. Last year the yield was only 5,500,000 bushels and a large part of that was of poor quality."

"The sharp drop in supplies of Durum has caused the market to skyrocket. It has sold this season as high as \$4.65 a bushel. At present the price is \$4 a bushel, or nearly double that of ordinary wheat."

"Even at that price there is little available. Most macaroni makers now are using a mixture of 25% Durum flour and 75% flour from soft wheats."

"Who suffers? Obviously the American public as well as the farmer who are becoming bankrupt. And who could deny the need for a chemical under such circumstances?"

"There are many other rusts and powdery mildews that fall in the same category. We can breed resistance for them but chemical industry may very well expect to be called upon to meet its obligation. It is no place for a faint-hearted organization, but there is a gold mine that will be exploited by someone. Conventional fungicides can, and may very well be used, but it seems that two other very fertile fields are before us and must be exploited: the use of systemic fungicides and the use of growth regulating materials to change the physiological susceptibility of the host."

"The use of systemic materials is clearly indicated because repeated spray applications of protective materials will become extremely expensive. Unfortunately, most of the modern organic fungicides are designed improperly for use as systemics. The techniques used in their development have placed a premium on lipophilic hydrophylic balance while the systemics should not have exceptional lipophilic properties. They must remain mobile in the cytoplasmic fluids hence must have polar groups. The average fungicide in use today, according to the researchers of Miller, McCallan, Burchfield and Owens of our laboratories, is non-specific in its action and easily detoxified by the fungus."

"Obviously we need a new type of molecule. To find a model of such a molecule we have turned our attention to the antibiotics because they are natural constituents of living cells that develop in large quantities without being detoxified and they remain mobile in cytoplasmic fluids. This approach to the problem is leading to constructive progress. We now have in our laboratories two antibiotics that are exceptionally active against powdery mildews and a large class of materials related to anisomycin that is very effective against rust fungi when applied 3 to 5 days after infection. These developments will eventually set the procedures for solving the problem of developing a penetrating local systemic."

"The regulation of plant resistance by chemicals is predicated upon the assumption that these rusts and mildews are obligate parasites so highly specialized in their pathogenesis that a minor change in cell physiology is fatal to their development. A change of only one or two genes gives resistance and the day will come when we can use exogenously applied chemicals to take over comparable vital processes of the cell. Such chemicals applied once during the season in small amounts, where needed, would in substance change the physiological functions for two to three weeks while the threat of a rust build-up existed. This is not an improbable dream but something that can, and will, be achieved in due time."

"Systemic disinfectants that will provide general control of fungi and bacteria must be developed. Currently we depend almost entirely upon deposits heavy enough to protect the surface from invasion. The treatment has limited usefulness, if any, after

selection is established, or if the parasite gains entrance through stomata, pores or other natural openings, is carried by a feeding insect that pierces the surface or injects saliva during probing and sucking or feeds systemically as in the case of most organisms.

It will be difficult to find these chemicals because they must be safe to the host and not present a health hazard to the consumer of the product. As pointed out above, the chemicals that will be used probably will have only one characteristic in common with the ordinary protective fungicides and that is ability to immobilize fungus growth. The molecules must be tailored to a different set of physical-chemical standards, be more specific in action, and be less subject to detoxification. These properties are difficult to come by but as we come to understand more about the biochemistry of the fungi and their hosts and the biochemical properties of fungicides, they will be achieved by chemists.

In the meantime, of course, the conventional protective fungicides will be the farmer's mainstay. Research will have to be directed to improving their performance by a study of their physical-chemical properties and by seeking more versatile and safer types.

The future needs of agriculture and industry in suppressing microbiological deterioration will be met only if research is put on a sound basis. It calls for patient money—extremely patient funds; but it also calls for realism. Management of industry and government cannot be expected to invest money in this cause no matter how worthy and demanding the cause unless the scientist can provide the ideas and demonstrate that he has the tools and skill to implement them. The scientists interested in this problem must first look at the problems of management before they look at research ideas.

The three white elephants of management in agricultural chemicals are low batting average scientists, slow pace of technical development, and hazards of registration. These elephants loom so large that some managers are driven to the point where the elephants take on a somewhat pink tinge. Their pink elephants are a problem beyond my professional competence so my remaining remarks will be directed solely toward shrinking the size of white elephants.

The batting average of chemists and plant pathologists is probably in the order of 1 commercial success in 1000 syntheses of new compositions for test. Inevitably the ratio comes down as the scientists gain in experience and background and it goes up as standards of performance increase with each new discovery. Fungicides are relatively easy to discover. In random testing they are discovered 10 to 10 times more frequently than insecticides. The candidates are rapidly weeded out because of phytotoxicity, poor persistence, chemical instability and other deficiencies arising from the rigid requirements for their use.

The low ratio of success will decrease even further and the cost of chemical synthesis will increase even more as the more obvious compounds are evaluated and the search widens into new areas. The only way to prevent this worsening condition is to improve research methods so there will be less empirical testing and more programs based on sound deductive reasoning. This calls for development of basic principles on the mechanism of fungicide action and the relationship of chemical structure to phytotoxicity. Such principles have been conspicuously absent.

Time does not permit a review of the substantial achievements in this area during the past five years. However, our ideas are being rapidly revolutionized and we are obtaining some useful insight into the strength and

weaknesses of modern fungicides. In our own laboratories, for example, six of our senior scientists are busily engaged in tracing the mechanism of plant protection by using labelled fungicides, in studying spore permeation, in determining the relationship of chemical structure of fungitoxicity, in developing hypotheses on the influence of chlorination on kinetics of fungicidal activity, and in determining the effect of fungicides on various classes of enzymes and cell metabolites. This broad basic research program costs in excess of \$150,000 a year but it is considered an essential expenditure if agricultural scientists are to be released from blind experimentation. Eventually a mass of information will accumulate to direct research into more efficient channels.

The slow rate of commercial development will not be telescoped greatly. Good, new fungicides rarely attain large volume of sales in less than five years after discovery. The period for Ferbam was seven

years, Thiram nine, Spergon three and Nabam about four years from announcement to commercialization. This long period comes from the fact that each material must be tested under a variety of field conditions and tests are seasonal in nature. The discoverer must perform limited field tests before he distributes the materials to others. He must then secure the endorsement of state scientists and federal regulatory agencies.

Management finds itself on the horns of a dilemma as soon as a new compound is recommended for field trial. Guesses have to be made on possible field success, cost of manufacture, toxicity for mammals and sales potential. A defect in any of these properties will kill the material and yet hesitancy in starting research on any one may delay the final registration so it can be marketed.

The chances of a promising material in the greenhouse serving effectively at competitive dosages when it

goes to the field is no better than 1 to 15. If all field candidates are immediately subjected to research on process of manufacture, formulation, analytical methods for residue determination and toxicology, the successful members may have a bill of half a million to a million dollars on the books against it. The hazard of such a developmental cost in light of current requirements in toxicology and registration is tremendous.

The agricultural scientist must, in light of this situation, develop better methods of predicting field performance and in perfecting formulations before the chemicals are taken to the field. In other words, a set of principles on the biophysical properties of fungicides must be developed. The response of the chemical to light, plant secretions, oxidative forces and to wind and rain erosion, must be determined. The factors can be measured in the laboratory and if they were properly evaluated most of the chemicals doomed to failure in the

(Continued on page 23)



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FARM LEGISLATION

(Continued from page 1)

declared that the Senate committee bill was a weak proposition at best and not improved by the actions of the Senate floor. The Chief Executive is said to have commented that unless the conference committee came through with some major refinements and improvements, the farm legislative outlook was unhappy.

This seems to mean a veto. And the outlook for any conference agreement on improvements to meet White House requirements are dim since the conference committee will be stacked with high price support addicts.

From the viewpoint of the plant food industry, there is little encouragement in the farm bill as adopted by the Senate—or the outlook from an inter-chamber conference.

But if certain provisions of the bill are retained, there may be some long range improvements which will work for the benefit of the industry. For example, if the bill can be adapted to White House approval and contains the 550 million dollar boost in the ACP program, it may be expected that the fertilizer industry may obtain some consequential business by late mid-summer and fall as cooperators in the conservation reserve program of the soil bank divert their acreage to the government program. Under this phase of the soil bank, producers who cooperate in the conservation reserve program would obtain payments to compensate them for out-of-pocket outlays for such materials as seed and fertilizer materials. It would be expected that they would not defer disbursements for fertilizer materials in such a program.

The soil bank aspects of the acreage reserve program are dark and uncertain. The Senate bill as passed makes a mandatory condition of soil bank participation up to 15% of tillable acreage of a farm for participation in price support for cotton, corn, rice and wheat. This provision would include a plowing under of winter wheat as eligible for soil bank payments and as a factor of price support eligibility.

How far producers will go in cooperating with this phase of the program is cloudy since at the time they planted their crop they did not know about this program and if the soil bank certificates do not have adequate value to compensate them for out-of-pocket costs, plus their possible market value at time of harvest, it would seem that the soil bank is an actual disservice to them, particularly if it stands between them and price support eligibility, unless they plow under at least 15% of their tillable acreage.

For corn and cotton, even this late hour may still permit these crops to get under a dateline enforcement of the soil bank by mid-April, but it is admitted that the certificate value inducement will have to be adequate to offset farmers' previous intentions and such commitments as they have made for seed and plant food materials.

This situation raises an interesting aspect of the soil bank and fertilizer sales to the corn and cotton belt. In the old cotton belt of the southeast, fertilizer industry trade sources feel that the industry will maintain its previous sales levels since that area has been better off this past year than in several previous years, income-wise. It has been an adage in the fertilizer industry in this area that fertilizer sales in any year reflect the cash income of the farmers for that area in the previous year. That idea may still be relatively effective in the cotton belt of the southeast, but it is not working in the highly efficient Corn Belt areas where farmers now see the great utility and

efficiency of use of modern fertilizer materials, USDA officials assert.

Fertilizer industry officials feel that if legislation can be passed and approved not later than mid-April, and if the law requires mandatory cooperation with the soil bank in the Corn Belt as a condition of price support, that there may be an unexpected stimulus to nitrogenous fertilizer material sales in that area.

For example, on a 100-acre corn farm, to attain eligibility for price support, the producer would be required to withhold 15 acres from production. If he had in the meantime contracted to buy fertilizer materials for his original 100 acres, he probably would use the full amount of fertilizer on his permitted 85 acres.

If he has not contracted for his full acreage requirement of fertilizer at this time and still wants to be eligible for price support and will withhold 15% of his acreage for the soil bank acreage reserve program, it is predicted that he will still buy in most instances enough fertilizer materials for a full acreage so that he can bring his per unit production costs of corn down through increased production of his planted acreage.

In view of the uncertainty of the legislative outlook (which now forecasts little more than a White House veto of the unacceptable alternative offered it) the fertilizer industry must at best stay in a fluid position to the extent that its dealers and manufacturers can operate most efficiently in their areas as far as their farmer customers are concerned.

This present situation in Congress is doing a great disservice to the farm community and to all the service agencies of the farmers such as the fertilizer dealers, seed companies and others.

At this time there is little prospect that there will be any farm legislation before April 10. The House, dominated by high price support addicts from both parties, is disinclined to act promptly and the outlook is that there will be nothing done before the Easter recess of Congress wherein the statesmen will recess between March 29 and April 9.

**Delta Cotton Farmers
Aim at Higher Yields,
Lower Output Cost**

STONEVILLE, MISS.—Regardless of the outcome of pending farm legislation, Delta cotton farmers are gearing their operations toward higher yields per acre, according to county agents of the Agricultural Extension Service.

L. H. Moseley, district agricultural extension agent, reports cotton advisory committees working with county agents have been meeting the past two months mapping out improved practices to increase yield per acre and efficiency in production.

The advisory committees, made up of cotton farmers in the various counties, assist the county agents in studying and analyzing research data and other improved methods and encourage such methods among all cotton farmers in the counties.

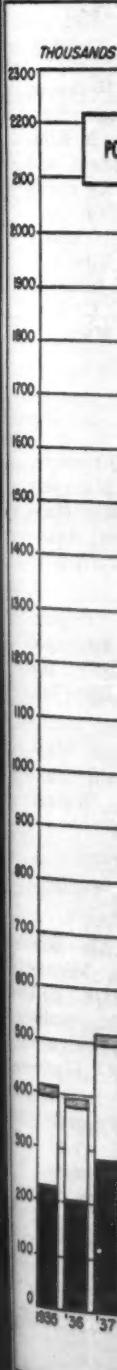
Mr. Moseley said information on land preparation, proper fertilization, precision planting, cross plowing, weed control, irrigation, complete insect control, improved harvesting and ginning is being given farmers in an effort to increase yields and to hold production costs to a minimum.

"Farmers who have constantly followed experiment station research and cotton advisory committee recommendations over the past several years have greatly increased the yields per acre while reducing production costs," Mr. Moseley said. "We still are making nearly as many bales on about half the acreage."

POTASH
(Continued)
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Point of delivery
Alabama . . .
Arizona . . .
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California . . .
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Connecticut . . .
Delaware . . .
District of Columbia . . .
Florida . . .
Georgia . . .
Idaho . . .
Illinois . . .
Indiana . . .
Iowa . . .
Kansas . . .
Kentucky . . .
Louisiana . . .
Maine . . .
Maryland . . .
Massachusetts . . .
Michigan . . .
Minnesota . . .
Mississippi . . .
Missouri . . .
Montana . . .
Nebraska . . .
New Hampshire . . .
New Jersey . . .
New Mexico . . .
New York . . .
North Carolina . . .
North Dakota . . .
Ohio . . .
Oklahoma . . .
Oregon . . .
Pennsylvania . . .
Rhode Island . . .
South Carolina . . .
South Dakota . . .
Tennessee . . .
Texas . . .
Utah . . .
Vermont . . .
Virginia . . .
Washington . . .
West Virginia . . .
Wisconsin . . .

Total U. S. (Imports)
THOUSANDS
2300
2200
2100
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
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100
0



POTASH DELIVERIES

(Continued from page 1)

potash containing an equivalent of 37,256 tons K₂O, and 13,558 tons of sulphate of potash containing 6,959 tons K₂O. The total chemical deliveries of 114,215 tons K₂O were 5% of all potash deliveries, and 22,406 tons or 24% more than in 1954.

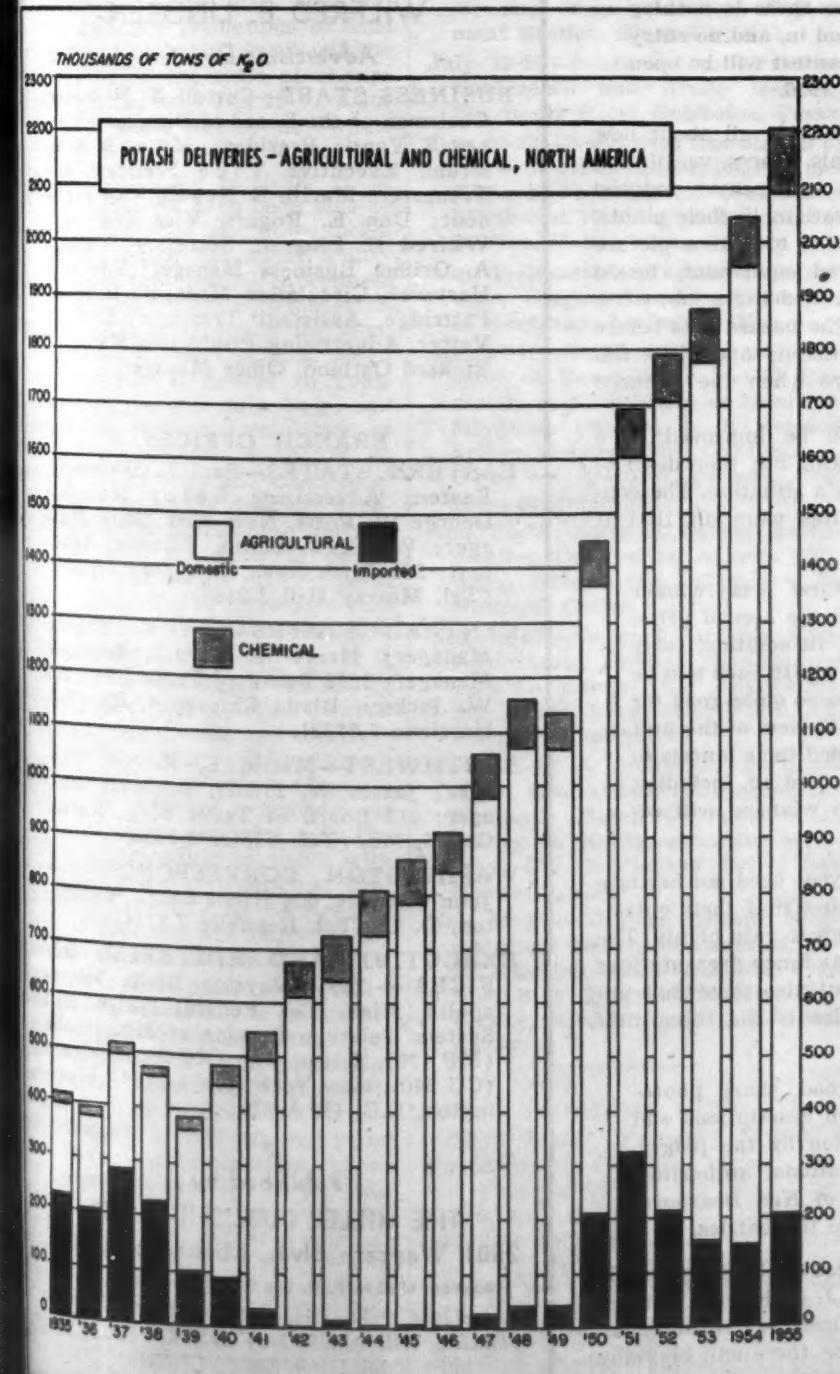
In the fourth quarter of 1955, de-

liveries totaled 1,034,430 tons of salts containing an equivalent of 600,029 tons K₂O, an increase of nearly 6% compared to K₂O deliveries during the same period in 1954. The continental U.S. received for agricultural purposes 505,779 tons K₂O, Canada 40,882 tons, Cuba 5,485 tons, Puerto Rico 4,167 tons and Hawaii 3,731 tons. Exports to other countries were 10,451 tons K₂O.

Chemical deliveries during the fourth quarter amounted to 47,625

Deliveries of Agricultural Potash Salts—1955

Point of delivery	In Tons of 2,000 lb. K ₂ O	Muriate, 60 & 50% Manure salts	Sulphates	Total
Alabama	62,546.84	12.00	232.89	62,791.73
Arizona	31.00		903.00	934.00
Arkansas	34,635.29	59.28	130.26	34,824.83
California	8,671.00		7,154.00	15,825.00
Colorado	696.49		83.15	779.64
Connecticut	3,539.79		1,306.13	4,845.92
Delaware	10,028.43		95.17	10,123.60
District of Columbia	316.68		97.67	414.35
Florida	88,513.14	32.00	28,684.26	117,229.40
Georgia	122,291.35	21.00	7,222.74	129,535.09
Idaho	658.58		3.00	661.58
Illinois	191,896.04		853.49	192,749.53
Indiana	145,617.07		2,333.31	147,950.38
Iowa	53,838.18		201.10	54,039.28
Kansas	2,557.68	422.46		2,980.14
Kentucky	25,198.17		9,446.09	34,644.26
Louisiana	24,365.02		140.71	24,505.73
Maine	10,489.34		656.49	11,145.83
Maryland	76,482.42		4,473.48	80,956.10
Massachusetts	13,050.27		1,131.21	14,181.48
Michigan	53,883.57		538.62	54,422.19
Minnesota	50,744.79		208.99	50,953.78
Mississippi	28,376.25		148.94	28,525.19
Missouri	43,528.56	363.10	267.61	44,159.29
Montana	63.00			63.00
New Hampshire	1,737.55			1,737.55
New Jersey	18.05		9.70	27.75
New Mexico	29,889.13		1,318.36	31,207.49
New York	54.65		8.00	62.65
North Carolina	36,865.23		1,186.97	38,052.20
North Dakota	81,129.23	66.70	18,490.80	99,686.73
Nevada	3,523.07	10.54		3,533.61
Ohio	183,924.85		1.00	1.00
Oklahoma	2,756.32		3,483.39	187,408.24
Oregon	3,459.37		80.80	2,837.12
Pennsylvania	37,939.19		193.24	3,652.61
Rhode Island	1,704.53		1,531.04	39,470.23
South Carolina	57,489.57	169.91	68.68	1,773.21
South Dakota	191.72		3,726.22	61,385.70
Tennessee	58,574.58			191.72
Texas	43,935.64		5,620.50	44,195.08
Utah	112.00		156.73	44,092.37
Vermont	564.40		21.00	133.00
Virginia	100,677.44	20.00	11,748.47	112,445.91
Washington	6,877.40		371.04	7,248.44
West Virginia	1,330.73			1,330.73
Wisconsin	54,322.68	49.43	787.24	55,159.35
Total U. S. (IMPORTS)	1,759,096.50	1,226.42	115,115.49	1,875,438.41
	(133,726.65)	(1...)	(123,157.50)	(156,884.15)



tons of salts with an equivalent of 29,534 tons K₂O, an increase of more than 10% over the same period in 1954.

In addition to the regularly reported deliveries on the quarterly basis, information from governmental and other sources indicates that during the second half of 1955 there were additional imports of European potash into the U.S., Canada and Puerto Rico of 117,419 tons K₂O as muriate of potash and 11,132 tons K₂O as sulphate of potash. These figures are included in the deliveries for the fourth quarter.

PROGRAM INCORPORATED

BURLINGTON, VT. — Vermont's Green Pastures program was incorporated at a recent meeting in Montpelier.

PYRETHRUM

(Continued from page 1)

Uganda in British East Africa, is the world's largest commercial producer of pyrethrum. Also important in the African pyrethrum picture is the Belgian Congo, which harvests approximately one half as many of the flowers as do the British growers.

Recent changes in American laws (principally the Miller Bill) have enlarged the importance of pyrethrum to the extent that African producers foresee a need for doubling present production rates by 1960. This year's crop is estimated at 4,000 tons for British East Africa and about 2,000 tons for the Congo.

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Croplife

A WEEKLY NEWSPAPER FOR THE FARM CHEMICAL INDUSTRY

The regional circulation of this issue is concentrated in the Southern states.

Unbounded Future Seen For Fungicides in U.S.

Some interesting and cogent observations on the subject of fungicides and their future, were outlined by Dr. George L. McNew at the recent spring meeting of the National Agricultural Chemicals Assn. Dr. McNew, managing director of Boyce Thompson Institute for Plant Research, in discussing the place of fungicides in controlling many destructive plant diseases, looked ahead to some of the fields thus far not attained by science. Dr. McNew's entire discourse appears elsewhere in this issue of Croplife.

After pointing out some of the future needs for control of rusts and mildews and other crop-killing diseases, he observed that the prospects ahead have "no place for a faint-hearted organization." Yet, he said, there is a veritable gold mine waiting to be exploited by someone in this field.

Two particularly fertile fields of endeavor lie ahead for the fungicide industry, he observed. These include the use of systemic fungicides and the use of growth-regulating materials to change the physiological susceptibility of the host. In each of these fields, much basic research needs to be done.

All of these observations by an authority in plant pathology tend to give better perspective to everyone in the industry. Despite the fact that great strides have been taken in the direction of plant disease control during the past two decades, he warns that there is no room for complacency. "We can control more diseases more effectively than anyone would have dared predict before the era of organic fungicides; we can produce a crop by modern sprays that is not only disease-free, but has heavy yields of high quality, nutritious products. The new fungicides have not been glamorous, but they have carried their full share of progress in feeding our people better with less waste and effort than ever before," he said.

At the same time, anyone who is willing to open his eyes can see that this is only the beginning, Dr. McNew continued. The American farmer and the American people deserve something even better. Not only are many diseases imperfectly controlled, some of them are running rampant year after year. Great will be the rewards to the man who will bring them under control and help to reduce a national tax on food of some \$85 per family."

Not only in the area of food crops would savings be realized. Fungicidal control of plant diseases would also prolong the service life of processed material in clothing, homes, industry and instruments subject to microbiological deterioration, he reminded.

"Better research methods and broad vision in defining the problem are necessary if we are to succeed in this challenge," he declared. "The industry that has contributed so much to American welfare through development and manufacture of fungicides is going to be called upon for even more effort, more vision, more investment, more confidence in the powers of its own research. Great is the need of this industry for true and useful knowledge. It is worthy of a better set of basic principles to guide its footsteps. Those of us who stand by your right shoulder in this struggle will do everything we can to help you develop these principles and see that they are used wisely," he promised.

Ahead is an undeveloped market of several tens of millions of dollars annually. What is more important is that we have the opportunity of improving the efficiency of American agriculture so that farmers can seed their land in confidence and cultivate it in security. And of course the consuming

public will profit most of all because the bountiful consistent harvest can be guaranteed free of rot, blight, rust and mildew.

This, we submit, is quite a challenge. We dare say that as these words are reviewed in the perspective of another ten years or so, many of the problems outlined by Dr. McNew will have been solved. But no one need fear that we will eventually run out of problems. Every new development brings with it a new set of unknown quantities. It is the price of progress, but it is a price well worth paying.

Safety Pictures to Bring Cash to Contest Winners

The "Picture of Safety Contest" recently announced by the Fertilizer Section of the National Safety Council, strikes us as being a very practical means to keep fertilizer employees alert to safety improvements in plants and to give them an incentive to tell others about it. With prizes totaling \$500, the rewards are large enough and numerous enough to make each individual feel he has a good chance to win something. In all, 43 cash prizes will be awarded.

Purpose of the contest, as outlined by the NSC announcement, is to "uncover good ideas which are already in practice, which have improved safety in fertilizer plants." With every employee of the industry eligible to compete, companies in the trade are urged to encourage their people to participate. It's a contest where there is nothing to buy, no box tops to send in, and no entry blank is necessary. The contest will be open from April 1 to June 30, 1956.

Employees of plants will know all about new guards, valves, warning signals, braces, ventilating equipment or other devices which have reduced or eliminated hazardous situations in their plants. What they are invited to do is to take a picture of the new device, improved equipment, tested operation or other safer way of doing a job; write a brief description of what the hazard was before corrective measures were taken; and then tell about what the results were when the pictured device was put into use.

Safety consciousness can be improved in a plant by the very act of looking for, then describing the device that improves a situation. The contest would be valuable if this were all that it accomplished.

But there is more. First prize winner will get a check for \$50; the second prize, \$30, and third prize, \$20. In addition, forty honorable mention prizes of \$10 each will be awarded, making the chances quite good for most of the contestants. Winners of the first three prizes will be awarded their laurels in an appropriate ceremony; and all, including the 40 honorable mention winners, will receive certificates.

Fertilizer industry employees need not hesitate at entering the contest fearing that their entries might not be elaborate enough to rate highly. The NSC emphasizes the fact that fancy presentations are not only unnecessary, but also somewhat undesirable, since the basic idea is the thing that counts most.

At the same time, good, sharp photographs and simple written descriptions will be taken into consideration by the judges. An imposing group of national authorities under the chairmanship of Ned Dearborn, NSC president, will judge the entries.

If more information is desired, industry people are invited to write to Mr. J. C. Kato, Fertilizer Section, National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill. We hope there will be many entries. Everyone stands to gain.



Croplife

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CROPLIFE is a controlled circulation journal published weekly. Weekly distribution of each issue is made to the fertilizer manufacturers, pesticide formulators and basic chemical manufacturers. In addition, the dealer-distributor-farm adviser segment of the agricultural chemical industry is covered on a regional (crop-area) basis with a mailing schedule which covers consecutively, one each week, four geographic regions (Northeast, South, Midwest and West) of the U.S. with one of four regional dealer issues. To those not eligible for this controlled distribution Croplife subscription rate is \$5 for one year (\$8 a year outside the U.S.). Single copy price, 25¢.

LAWRENCE A. LONG

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DONALD NETH

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MEETING MEMOS

March 28-30—North Central States Branch, Entomological Society of America, Purdue University Memorial Union, Lafayette, Ind.

March 30—Meeting of Louisiana Aerial Applicators, Louisiana State University, Baton Rouge.

March 30-31—Short Course in Ground Application of Agricultural Chemicals, University of Washington Campus, Seattle.

April 8-13—American Chemical Society, National Meeting, Dallas.

April 10-12—Council for Agricultural and Chemurgic Research, 21st Annual Conference; Congress Hotel, Chicago; sec., John W. Ticknor, Council for Agricultural and Chemurgic Research, 350 Fifth Ave., New York 1, N.Y.

April 11-12—Regional Pasture Tour in Eastern Virginia, arranged by Virginia Polytechnic Institute Agricultural Extension Service.

April 16-17—Fourth Annual California Fertilizer Conference, Citrus Experiment Station, University of California, Riverside; Sidney H. Bierly, secretary, 457 Huntington Drive, San Marino 9, Cal.

May 7-9—Carolinas-Virginia Pesticide Formulators Assn., Inc.,

FUNGICIDES

(Continued from page 19)

field could be eliminated in a matter of a few weeks of greenhouse testing rather than waiting two or three years until a bill running into tens of thousands of dollars had been incurred. Infallible predictions of field performance probably never will be achieved but if the ratio of chance can be reduced from 1 in 15 to about 1 in 3 it would change the whole aspect of field developmental costs.

This research on methods is 30 years overdue. We have been able to perfect very precise laboratory methods of evaluating fungicidal ability and reliable field testing procedures but no one has studied why materials that appear so promising in the laboratory fail in the field. A good set of basic principles is needed to guide formulation research into logical channels. At present, formulation of agricultural chemicals is an art almost devoid of scientific exactitude. We know what sort of data are needed to guide the formulator, but no one has taken the time to devise equipment and locate the general physical properties of molecules that will determine their success or failure in specific uses.

Data are needed on the nature of plant surfaces, the changes in such surfaces during growth and weathering, the adherence of particles to such surfaces and the retention of pesticides under different conditions of rainfall, wind, sunlight, etc. The methods of amending particles with surfactants, deposit builders and light masking and of changing the size and shape of particles will follow easily once the desired principles are known.

The Boyce Thompson Institute feels that this problem is so important that it is investing \$200,000 in new physical facilities to implement these ideas. Unfortunately, money is immediately available to employ the scientists needed to carry on these involved investigations which will require the services of physical chemists, plant pathologists and plant physiologists. The question is whether basic researches on the biochemistry of fungicides should be delayed while we work on their biochemistry. We do not believe so until all other possibilities of support are exhausted.

CHEMICAL FUND

NEW YORK—Francis S. Williams, president of Chemical Fund, Inc., has announced that the fund's net assets had crossed \$125,000,000 for the first time in its history. Assets as of March 15, were equal to \$125,217,610 and compare with \$79,688,331 a year earlier. Chemical Fund was founded in 1938 to invest in securities of chemical and allied companies.

Kansas Firm Expands In Farm Chemicals

ATCHISON, KANSAS—The Econo-Gas Division of Blish, Mize and Silliman Hardware Co. here is starting the spring season with an expansion program which will include farm chemicals in its sales program, according to Frank Johnson, division manager.

Two men have been named as representatives of the organization in this area. Charles Kuenzi, vocational agricultural instructor at Troy, Kansas, will be Kansas representative. Frank B. Clayton, a recent graduate of Kansas State College, Manhattan, will be Missouri representative for the firm.

Willard Cook, who served as representative for the company the last two years, has resigned to become territory representative for the Olin Mathieson Chemical Corp. for southeastern Nebraska with headquarters in Lincoln, Neb. Ray Vandiver is plant operator for the firm.

SUPERINTENDENT NAMED

CHICAGO—Chicago Steel Tank Co., a division of U. S. Industries, Inc., recently appointed George M. Sanders, general superintendent. Mr. Sanders will be in complete charge of manufacturing operations.

CROPLIFE, March 26, 1956—23

Classified Ads

Classified advertisements accepted until Tuesday each week for the issue of the following Monday.

Rates: 15¢ per word; minimum charge \$2.25. Situations wanted, 10¢ a word; \$1.50 minimum. Count six words of signature, whether for direct reply or keyed care of this office. If advertisement is keyed, care of this office, 20¢ per insertion additional charged for forwarding replies. Classified advertising rate not available for commercial advertising. Advertisements of new machinery, products and services accepted for insertion at minimum rate of \$9 per column inch.

All Want Ads cash with order.

Seminar on Economics Of Fertilizer Use Scheduled at Knoxville

KNOXVILLE—A seminar on agricultural economics problems, with special emphasis on research in fertilizer economics, has been scheduled here March 27-30.

Included in the sessions will be reports of cooperative state-TVA research projects on the economics of fertilizer use from North Carolina, Iowa, Mississippi and Michigan.

The program also will include a session on "An Examination of Liquid Fertilizers" the afternoon of Mar. 28.

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A Practical Approach to a Profitable Cotton Crop

One of the most important meetings of interest to cotton producers is the Beltwide Cotton Production Conference held in Memphis. In a speech at that meeting, Dr. Fred C. Bishopp passed along these nine points on better farming practice. Dr. Bishopp for many years was assistant chief in charge of research, Bureau of

Entomology and Plant Quarantine, U. S. Department of Agriculture. Now retired, Dr. Bishopp has been an authority on insects affecting cotton for nearly a half century. This nine-point program advanced by Dr. Bishopp is of such importance that it is being published in the public interest.

1. "Gather the present crop as soon and cleanly as possible, destroy the stalks, and turn under the debris. Use effective stalk shredders, or graze the crop heavily if livestock are available.
2. "Plant well adapted varieties in well prepared soil as early as consistent with local conditions. Uniform planting period throughout a community is highly desirable.
3. "Treat the seed for disease control.
4. "Plant cotton as far as possible from good weevil hibernation quarters.
5. "Do not fertilize too heavily nor irrigate too late.
6. "Strive for an early and full set of fruit. This means control of early season pests such as thrips, fleahoppers and other insects that retard growth and delay fruiting; also boll weevils if especially abundant.
7. "Apply insecticides as recommended by state authorities both as to kind, application schedules and dosages. Remember that rank stalks and heavy foliage require more material than small plants of open growth. When applying insecticides do not under-dose.
8. "Keep a close watch for insects in every cotton field. Thorough inspections should be made at regular and frequent intervals, either by the farmer himself or by a competent scout.
9. "A community-wide fight against the boll weevil, and a number of other insects as well, is of great value to all, especially in bad insect years."



NX56-2

*Agricultural Chemicals Division
Naval Stores Department*
HERCULES POWDER COMPANY
INCORPORATED
931 Market St., Wilmington 99, Del.

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